Agriculture Dept.
Madras,
report on the operations
1902-03 to 1909-10

00134072

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REPORT

ON THE

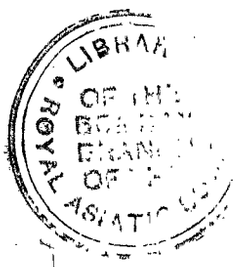
OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY,

FOR THE OFFICIAL YEAR

134072

1902-1903.



MADRAS:

PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1903.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1902-1903.

I.—PREFATORY.

The post of Director of Agriculture was held by the Hon'ble Mr. Atkinson in the first week of April 1902 and then by Sir F. Nicholson till the 4th November 1902, when he went on privilege leave, on the expiry of which he was placed on special duty. The Hon'ble Mr. Weir was in charge of the Department for the remainder of the year. Mr. Benson, the Deputy Director, continued to do duty till the 4th October 1902, when he went on nine months' leave, the Sub-Assistant Director, M.R.Ry. C. K. Subba Rao, being in charge of his office. The office of the Superintendent, Civil Veterinary Department, was held throughout the year by Veterinary-Major Gunn, and that of the Government Botanist by Mr. Barber.

2. In July and August 1902 Sir F. Nicholson was on tour in the Salem and Coimbatore districts to inspect the Barur Tank Project and examine the programmes of famine-relief works. In March 1903 the Hon'ble Mr. Weir inspected the Koilpatti farm and thence proceeded to Tinnevelly to ascertain whether a Veterinary dispensary could be established at the place. Mr. Benson inspected the experimental farms at Bellary and Koilpatti frequently and the Samalkot farm in September 1902. M.R.Ry. Subba Rao besides visiting the said farms and the Government fibre plantation at Hindupur from time to time, was frequently on tour in several districts to ascertain the native methods of reclaiming saline soils. Towards the close of the year, he accompanied the Inspector-General of Agriculture in his tour of agricultural enquiry through Southern India.

II.—SCIENTIFIC AND NATIONAL ENQUIRY UNDER IMPERIAL DIRECTION.

3. *Geology.*—The annual report has not yet been received from the Director Geological Survey.

4. *Chemistry.*—Dr. Leather's report shows that during his stay at Saidapet he did not perform any analytical work.

5. *Entomology.*—Specimens of locusts which appeared in the Bellary and Tanjore districts were sent to the Superintendent, Indian Museum, who found that those from the former district belonged to the species *Acridium Succinctum Linn* which was frequently reported as doing damage to crops in the Deccan. The specimens from Tanjore were identified as belonging to the species *Hieroglyphus furcifer Sauss*, family *Acrididæ*. The Superintendent suggested poisoning by means of traps, the leaves of any plant to which the insects are partial being suitably poisoned and scattered through affected tracts. Caterpillars which caused damage to gingelly crops in the Madura district were examined and found to belong to the family *Arctudae*; but could not be exactly identified in the absence of the moths into which they transform. The Collector was unable to send specimens of the moths. Three kinds of

insects which caused damage to the tobacco crop in the Tanjore district were examined by the Superintendent. One was identified as being the mole cricket belonging to the genus *Gryllotalpa* and species, probably, *Africana*. The Superintendent stated that the insects could be caught at lamps exposed at night in the fields and also in tobacco or other tins sunk into the soil till the edge is level with the ground, or lengths of the big bamboo with some water at the bottom if tins are not available. He also suggested the watering of the plants with a solution of soap in water (1 oz. to 1 gallon). The other insects were presumed to be grubs of a noctuid moth, but could not be determined without a specimen of the moth. Certain small insects found in patches on the leaves of the tobacco were *aphidæ*, *Plantlice* and were sent to a specialist for determination. Spraying with London Purple or other arsenical poison was recommended as the treatment for the caterpillars and similar treatment with kerosine emulsion for the aphidæ.

6. *Imperial Institute.*—The department continued to supply specimens of economic products to the Reporter on Economic Products. Specimens of 34 articles were forwarded to him during the year, besides fifty baskets of living specimens of *dioscoreas* (yams). Other articles forwarded were seeds of certain local varieties of the indigo, for transmission to Japan for experimental cultivation; dried leaves of Cassia Montana on the requisition of the Reporter on Economic Products who wished to determine whether the plant represents a species cultivated as a possible substitute of Senna (*Cassia angustifolia*) and specimens of carved cocoanuts from Minicoy.

7. At the instance of the Inspector-General of Agriculture enquiries have been started regarding (1) the various methods of increasing fodder supplies and (2) natural vegetable foods gathered and used by poor people especially in years of scarcity or famine. Reports are being received from district officers and will be dealt with in due course.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

8. Four agricultural probationers were appointed during the year, two of whom were deputed to Bombay to receive practical training in the farms worked in that Presidency. The two experimental farms at Bellary and Koilpatti continued to work during the year.

9. At the former place the farm has been thoroughly cleaned and every field made accessible to cart. It was enclosed with a wire fence to prevent cattle trespass and the farm buildings were all finished. Owing to heavy rain the yield of the several varieties of early *sorghum* was poor; but the crops of white cholam, cotton, Italian millet and Bengal—gram did well. The outturn of the first three grown on the plots intended for experimental tillage and manuring, though more uniform than in the previous year, was not sufficiently so to allow of the commencement of the experiments. Thirty-nine varieties of cotton forwarded by the Inspector-General of Agriculture and a local variety were dibbled in plots varying from 6 to 10 cents. Four of them did not germinate; 14 varieties did very well and yielded not less than 50 lb of lint per acre. The other varieties grew sparsely, the growth of individual plants being, however, generally good. Cotton was also sown on 23·87 acres in the usual way by the drill and yielded on an average 133 lb of seed-cotton per acre equivalent to 33 lb. lint. The question of hybridizing the South Indian varieties with imported and other superior varieties is engaging attention. The vines of three varieties of American sweet potato, viz., Virginia, Nanseimond, and New Jersey were forwarded by the Director of Agriculture, Bombay; but they were received so late as the 1st December in a rather fermented condition. Only the Nanseimond variety sprouted; but it was eaten up by hares. Cattle manure was collected according to the local method and the byre and loose-box systems.

10. At the Koilpatti farm, there was drought during the south-west monsoon, followed by heavy rain in the north-east monsoon. The black soil was eroded in many places and nearly a fourth of the red soil block was submerged by a neighbouring tank. When the rains ceased, there was keen competition for skilled labour and building work was much retarded. The Inspector's quarters were, however, finished before the close of the year, though the roofing of the outhouse remained to be done.

Owing to excessive rain, the crops practically failed, but cotton sown at the end of October grew fairly well. Fodder cholam yielded well, the outturn being nearly a ton per acre. The cultivation of ragi was instructive. Twenty cents of land were laid out into ridges and furrows and the seedlings were planted on the ridges, while 80 cents were laid out into flat beds as usual. In spite of the rain, the crop on the ridges gave an outturn of 935 lb. of grain and 3,005 lb. of straw per acre against 640 lb. of grain and 3,380 lb. of straw per acre from ragi planted on flat beds. One acre of poor soil was manured with 600 cart-loads of tank silt and yielded 818 lb. of grain and 3,075 lb of straw, while on a plot of unmanured land planted at the same time, the outturn was 515 lb. of grain and 2,010 lb. of straw. Sweet potatoes were planted on 10 cents and yielded notwithstanding the adverse nature of the season at the rate of $3\frac{1}{2}$ tons of good tubers worth Rs. 63 and nearly $6\frac{1}{8}$ tons of vines fit for stock consumption per acre. When the tubers began to form, the vines were lifted in accordance with the suggestion of the Inspector-General, in order to prevent them from striking root at too many places and forming numerous thin tubers instead of a smaller number of well-devoloped ones. During the current year the advantage of lifting the vines will be tested by planting two plants of equal size and quality. Mango, jack, guava, pumplemoose, pomegranates, satghur oranges, lemons, custard apples and figs have been planted and about 300 cocanuts were planted in a nursery for forming a plantation. Most of them have sprouted.

11. *Samalkot experimental station.*—As stated in paragraph 13 of the previous year's report, this farm was opened for experimental cultivation of sugarcane in order to facilitate the investigation of the precise nature and mode of propagation of sugarcane disease. Fourteen varieties were cultivated, seven being local varieties and the remaining seven having been obtained from outside the district, principally from Poona. Owing to late arrival of instructions there was not time for preparing the land and the plants were put in a month too late. The season was a trying one, there being a prolonged drought followed by heavy rains. But much attention was paid to the matter of thorough drainage with the result that the plantation as a whole was the best in the neighbourhood. Owing to changes in the character of the soil even in the same field and to differences in level, there was considerable variation in the growth of the canes in different parts. The crop was cut in March 1903 and the varieties grown were analysed by the Chemist of Messrs. Parry & Co.'s Sugar Factory at Samalkot. The results obtained from the foreign canes were on the whole inferior to those of the local ones; but it is probable that the new kinds will take a year or two to declare their true value. Owing to the inequality in growth of the introduced kinds it was impossible to obtain comparative yields per acre. All the varieties grown have been replanted and to these nine acclimatised Mauritius canes from the Vizianagram plantation have been added. There are now sixty plots planted containing over 100 experiments against 38 plots in the last season. The health of the canes was on the whole good; but certain diseases were noticed in the canes introduced from Poona. The two most serious diseases were a smut, which affected five plots, and secondly a large coccid which appears to be new to this country. It was at first considered to be new to science but has since been identified. For these and other reasons it was decided not to distribute cane to the ryots, though in two cases 1,500 sets were entrusted to cultivators under written agreements that they should not use them for planting purposes next year without the consent of the Government Botanist. Paddy being the chief crop of the delta, it was thought worth while to introduce a short sixty-day variety from Tanjore, so that two crops could be taken off in the season instead of one. Three quarters of an acre were accordingly planted with this variety as first crop and successfully reaped, and then a second crop was raised on the same land.

12. *Durian plants.*—In paragraph 23 of the report for 1900–1901 it was stated that 150 durian seedlings were received from the Agri-Horticultural Society and distributed to certain officers for experimental cultivation. From reports obtained during the year it was ascertained that owing to want of attention to the conditions necessary for the successful growth of the plant, 133 seedlings died and only 17 were alive. According to the Government Botanist the plant thrives on the alluvial banks of rivers or in high forests at an elevation not exceeding 2,000 feet above the sea level. It also requires a humid climate with a rainfall of 80 to 100 inches.

13. *Ground-nuts.*—A report was submitted to Government in October 1902 on the results of the further experiments with the East African varieties of the ground-nut. It was found that in South Arcot, the largest ground-nut producing district in the Presidency, the East African variety was considered to be inferior in productivity to the Mauritius seed and that the ryots preferred the latter. Further experiments were made in the Government farms at Koilpatti, Saidapet and Bellary. At the first of these farms four varieties—Japan, Sine, Gambie and Haut Saloum—were sown on beds measuring $6\frac{1}{4}$ cents each. The crops suffered first from heavy rain and then from drought. The outturn was at the rate of 850, 880, 971 and 900 lb. per acre. At the Bellary farm the only land suitable for ground-nut proved to be saline. Of the six varieties cultivated in beds of 36 square feet each, only the Mauritius and the East African variety named Gambie, being on comparatively good land, succeeded. Seven pounds of pods of these varieties have been obtained and reserved for seed.

14. *Indigo plant.*—It was brought to the notice of Government that *Indigofera arrecta* is a superior kind of indigo containing up to one per cent. indigotine as against ·58 maximum of the *tinctoria*, that it stands both drought and rain better, produces more leaf and yields more cuttings per annum and that being a perennial, it should stand for five years or more. A small quantity of the seed of this variety was obtained and arrangements were made for its experimental cultivation at the Saidapet farm with such local varieties as could be found by the Government Botanist. A small quantity of the seed was forwarded to the Superintendent, Demonstration Farm, Trivandram. On the report of Major Prain that *indigofera racemosa* has the greatest reputation of all the varieties and that it is preferred in Madagascar to all other kinds, Government have directed that arrangements should be made for the collection of specimens of all the varieties of the indigo plant grown in the Presidency and that the Government Botanist should examine the specimens in order to determine whether they comprise the *racemosa* variety. Arrangements have been made accordingly.

15. *Paspalum dilatatum.*—A small quantity of seed of this plant obtained from Australia was sent to this Presidency for experimental cultivation by the Superintendent Royal Botanical Gardens, Calcutta. It was sown at the Bellary and Koilpatti farms, but did not germinate.

16. *Aloe plantation.*—The further expansion of the Government plantation at Hindupur was not found possible in the last season. Owing to heavy rain, a sort of disease appeared among the sisal hemp plants characterized by the dying of the tips; but it soon disappeared. The plants have grown well. About 500 suckers have been put forth. 200 plants of *Agave vivipara* died owing to excess of rain. The attempts of the department to obtain a supply of the seeds or plants of *Agave tequilana* have proved unsuccessful, as it is not cultivated in Europe.

17. *Saline soils.*—The existence of saline lands under the Periyár project having attracted attention, Mr. Keeling, Executive Engineer, Madura, was authorized to conduct experiments for reclaiming 200 acres of such lands. The experiment is proceeding. A general investigation of the methods usually adopted by ryots for the reclamation of such lands was being conducted by the Sub-Assistant Director during the year. To encourage reclamation, Government have, on the recommendation of the Board, sanctioned the grant to select ryots, remission of assessment for three years on certain conditions.

18. *Meteorology.*—As usual the rainfall registered at the rain-gauge stations was tabulated and the results published by the Meteorological Reporter to the Government of Madras. The total number of stations in the Presidency at the end of the year was 433 (inclusive of 61 in the Native States) or 6 more than at the end of the previous year; of these 340 stations were inspected during the year.

19. *Statistics.*—The following returns were published in connection with local enquiries under provincial direction:—

(1) Report on the operations of the establishments for stamping weights and measures submitted to Government in July 1903.

(2) Season reports in three sections (rainfall, cultivation and prices of food-grains and salt) monthly.

(3) Quarterly reports of cattle mortality.

20. *The Madras Agri-Horticultural Society.*—The income of the society from various sources, including the Government grant of Rs. 4,000, amounted to Rs. 14,584. The usual flower-show was held on 22nd February in the Nursery gardens and was well up to the average of the previous years, the annuals being perhaps better than in the two previous shows.

IV.—BOTANY.

21. As stated in the previous year's report, the office of the Government Botanist, which was originally sanctioned for five years, was made permanent, and his head-quarters were removed from Ootacamund to Madras. An assistant for entomological work was added to his staff. A detailed report on the work done by the Government Botanist is appended. The chief tour undertaken in connection with the *Botanical survey* of the province was in the Gódávari gorges in November and December 1902; the dry flora along the banks of the river and a number of species among the evergreen forests of the Eastern Ghauts near Bison Hill were collected. Under *economic botany*, besides his work in connection with sugar-cane disease at the sugar-cane station at Samalkota, Mr. Barber investigated the spike disease in the sandalwood plantations in Mysore and Coorg under the orders of the Government of India. An interesting report was submitted by him and published in the *Indian Forester*. He also examined the disease in pepper vine plantations in the Wynaad, collected and transmitted to Dehra Dun thirty-two varieties of fungus flora, and has been asked to examine specimens of the indigo plant as stated in paragraph 14.

V.—VETERINARY.

22. The detailed report on the operations of the Civil Veterinary Department is appended. The question of establishing a Veterinary school or college in this Presidency was under consideration in view mainly of the difficulty in obtaining qualified subordinates for Veterinary duties. Towards the close of the year, the Board submitted proposals for the establishment of a veterinary institute in connection with the infirmary belonging to the S.P.C.A. at Vepery. They have been approved by Government and detailed proposals have recently been submitted to Government. The establishment of a few veterinary dispensaries at carefully selected centres, which was sanctioned in 1900, continued in abeyance, owing to the difficulty of obtaining qualified men for charge of them. The District Board of Trichinopoly secured the services of a veterinary officer and opened a dispensary at Trichinopoly in February 1903. The Court of Wards is making arrangements for opening another in Pittapur, the head-quarters of a zamindari state under its management.

23. *The pony-breeding operations.*—A stallion was destroyed during the year and three were lent to private breeders. Of the remaining 8 stallions 6 stood in Coimbatore and 2 in Salem. Four stallions were purchased towards the close of the year. The total number of coverings was 352 against 425 in the previous year, giving an average of 32 mares per pony against 35 in the previous year The decrease is attributed to the prevalence of plague, bad season and also to the instructions issued that only approved mares in season should be covered. Of the 425 coverings of the previous year, 101 cases were successful including 18 that aborted giving an average of 23·8 per cent. Two hundred and thirty-nine cases were empty, 9 mares died and the results were not ascertained in 76 cases. The condition of the operations formed the subject of a report by the Superintendent, who proposed that they should be conducted on new lines and that the spontaneous action of the owners of mares should be relied on, no pressure of any kind being put on them. He recommended that the arrangement should be tried for five years, at the end of which, if success was not achieved, the operation should be discontinued. His proposals have been approved. On the recommendation of the Superintendent, the Board has abandoned the proposal to increase the staff of salustries.

24. *The mule-breeding operations.*—These operations were discontinued during the year (G.O., No. 626, dated 18th July 1902) and the four donkey stallions were sold. Prior to their sale they covered 113 mares.

25. *Castration.*—Thirty-one entire ponies in the Coimbatore district and 34 in the Salem district were castrated against 56 and 82 in the previous year.

26. No pony shows were held during the year.

27. The Cattle Disease Act (II of 1866) was put in force in connection with cattle fairs in eight places in the Tinnevelly district. In six of these a Veterinary Assistant assisted the local authorities in carrying out the provisions of the Act. The reintroduction of the Glanders and Farcy Act into the Madura district was held in abeyance for want of professional men to supervise its working.

An important item of work done under this head during the year was the inoculation of 117 cattle in the Kistna district and of 260 in the Tinnevelly district against anthrax. This operation would have extended to other places also, but for want of serum. During the last quarter of the year, Mr. Stockman, Bacteriologist of the Muktesar Laboratory, visited this Presidency and conducted a series of experiments in inoculations with anti-rinderpest serum at Berhampur and Ongole. This opportunity was taken to attach the veterinary assistants to him by turns to be trained in the method of inoculation.

VI.—AGRICULTURAL EDUCATION.

28. Orders were passed by Government during the year regarding the reform of primary education. It has been directed that in all schools in which there is a trained teacher competent to give instruction in elementary science, that subject should in future be compulsory; that, where village maps of suitable size are available, a copy should be hung up in the village school and the more intelligent pupils should be taught map-reading from it; that a passed student of the Agricultural College should be attached to every training school as an additional teacher after he has undergone a short course at the Teachers' College; and that a school garden should be attached to the district training school wherever it is possible to do so.

Arrangements were made during the year for imparting instruction in Agriculture and Botany to the minors under the Court of Wards at Newington. A member of the staff of the College of Agriculture, Saidapet, taught Botany twice a week and the wards attended the practical field class at Saidapet twice a week.

29. *Higher education.*—The College of Agriculture continued to work and the number of students rose from 38 to 50. Government passed orders on the report of the Special Committee and the revised curriculum recommended by it was introduced at once. The salient features of it are that all mornings should be devoted to outdoor work, viz., every description of farm work in the first year, cultivation of given areas in the second year, and specific kinds of work such as dairying in the third year, and that the afternoons should be devoted to theoretical instruction; that Agricultural Chemistry should be taught as a separate subject; and that students should pass in general Chemistry, Botany, Meteorology and Geology, Anatomy and Physiology before they can appear in practical Agricultural Chemistry.

In order to encourage agricultural studies, an appointment on Rs. 40 per mensem has been guaranteed annually to the best student of the college in the year, and the diploma in agriculture has been prescribed as a necessary qualification for Assistant and Deputy Commissioners and Supervisors in the Settlement Department, native assistants to the Director of Agriculture, Agricultural Inspectors and Farm Superintendents and teachers of agriculture. The results of the final examinations were fair.

Dr. Leather, Agricultural Chemist to the Government of India, did duty at the college from the 10th March to the 15th April. He delivered 21 lectures and spent several hours every day giving instruction in quantitative chemical analysis to class III. As the Government of India have found it inconvenient to spare his services from Dehra Dun, his annual lectures at the college will cease from the current year, and the Principal of the College will deliver the special course of lecture hitherto assigned to Dr. Leather pending the appointment of an Agricultural Chemist in this Presidency. The usual lectures on veterinary matters to the agricultural students were delivered by Veterinary-Major Gunn, Superintendent, Civil Veterinary department between 11th November and 12th December 1902. He took two practical classes weekly and lectured once a week. His lectures were confined to the various forms of contagious disease and their prophylactic treatment. Five lectures were given on these subjects and ten with practical demonstrations on the more simple diseases and injuries.

The Veterinary Hospital continued to increase in popularity, the total number of cases treated having risen from 867 to 1,152.

The students of the College of Agriculture made two tours of agricultural enquiry, the first in October in the Cuddapah district and the second in January in the Coimbatore district.

VII.—THE PUBLICATION OF AGRICULTURAL INFORMATION.

30. A note on simple machines for extracting plantain fibre by Mr. Proudlock, Curator, Government Botanical Gardens and Parks, the Nilgiris, was published as a bulletin of the department. It has been decided to translate the note into the vernaculars and publish it with suitable modifications and additions for the information of ryots.

31. The Industrial Monograph on "Wood-carving" prescribed for the preceding year was not completed by Mr. Thurston, owing to non-receipt of certain photographs from the Travancore Darbar and of certain exhibits sent to the Delhi Exhibition from the Madras School of Arts.

The subject chosen for the monograph for the year under report is "Tanning and working in leather." The work has been entrusted to Mr. A. Chatterton, the Officer in charge of the School of Arts, Madras. The monograph is, however, not due before October next.

32. The number of papers received from and communicated to other Provincial departments was as follows:—

PAPERS received from and communicated to other Provincial Departments during 1902-1903.

Subject.	Received.							
	Reports.		Books.		Pamphlets.		Journals.	
	Indian.	Foreign.	Indian.	Foreign.	Indian.	Foreign.	Indian.	Foreign.
1	2	3	4	5	6	7	8	9
Agriculture	17	20	1	17	133	138	62	287
Statistics—Crop	..	..	2	..	..	..	..	..
Statistics—Trade	..	..	3	..	..	..	4	3
Forest	18	..	..	..	..	..	14	..
Arts and Industries	..	..	..	..	2	..	56	..
Botany	3	..	2	..	..	..	..	..
Entomology	..	..	..	..	..	..	..	..
Geology and Minerals	4	..	..	..	..	..	..	..
Meteorology	19	..	..	..	..	..	..	..
Live-stock	..	..	..	..	..	..	50	..
Veterinary Science	10	..	..	..	3	..	..	..
Total	71	20	8	17	138	138	186	290

Subject.	Received—*cont.*				Sent.			Total.
	Other papers.		Total.		Reports.	Pamphlet.	Other papers.	
	Indian.	Foreign.	Indian.	Foreign.				
10	11	12	13	14	15	16	17	
Agriculture	23	34	236	496	..	1	..	1
Statistics—Crop	..	..	2	..	..	..	17	17
Statistics—Trade	..	..	7	3	1	..	..	1
Forest	..	..	32	..	..	..	..	..
Arts and Industries	..	..	58	..	..	..	..	..
Botany	..	..	5	..	..	..	..	..
Entomology	..	..	..	..	..	..	..	..
Geology and Minerals	..	..	4	..	..	..	..	..
Meteorology	..	..	19	..	..	..	..	..
Live-stock	..	..	50	..	..	..	..	..
Veterinary Science	..	..	13	..	..	..	..	..
Total	23	34	426	499	1	1	17	19

APPENDIX I.

Annual Report of the Government Botanist, Madras.

I have the honour to forward the following report of the work of my office during the year 1902-1903.

2. Owing to the transfer of my head-quarters to Madras the ordinary course of touring was considerably interfered with. The following were the chief places visited :—

Ootacamund.—This was my head-office until 1st July and some two months were spent there in arranging the collections for the transfer.

Madras.—After 1st July my office was located in the Board's buildings at Chepauk. For reasons given below, only two months of the remaining nine were spent in Madras, the rest being devoted to travelling.

Samalkot.—Nine visits were made during the year to the experimental sugar station. The longest of these was for the month of March during which the crop was reaped.

Coorg.—The first half of June was spent, chiefly at Fraserpet, in the investigation of the sandalwood disease known as "spike".

Kistna district.—A general agricultural tour was made through the dry taluks of this district, from the end of September to the beginning of November.

Gódávari gorges.—A plant-collecting tour was made up the river during the latter part of November and the first half of December.

South Wynaad.—A fortnight in January was devoted to a tour through the planting districts of the Wynaad, most of the time being spent in the investigation of the pepper disease.

3. An important change was made during the year in the work of the Government Botanist. By G.O., No. 292, Revenue, dated 25th March 1902, he was transferred to the Agricultural Department and his work became mainly economic. As a consequence of this, his office was moved from Ootacamund to Madras. The collections were safely transmitted at the end of June. The rooms in the Board's offices are ill-suited for microscopic and general laboratory work, and, pending the erection of suitable quarters, the Government Botanist found it advisable to spend a considerable part of the year on tour.

4. The only tour devoted definitely to the botanical survey was the short one in the Gódávari gorges. The dry flora along the banks of the river were carefully collected, and a number of species were also obtained on a five days' trip among the evergreen forests of the Eastern Ghauts near Bison Hill.

Besides this main tour, smaller collections were made in the Kistna district, in Coorg, around Coonoor and Ootacamund, at Gudalur, in the Wynaad and down the Tambracherry ghât. No great effort was, however, made to increase the collections, since the preparing work was completely disorganised by the removal of the herbarium.

5. A commencement was made towards collecting a fungus flora of the Presidency, the Cryptogamic Botanist to the Government of India having expressed a desire for Madras specimens. Thirty-two collections were made and forwarded to Dehra Dun during the year.

6. Among the numerous specimens received for identification, five parcels of grasses were sent in by different Forest officers. The work of naming these is proceeding, but little progress has been made in this direction because of other work. About 130 sheets of grasses have been named during the year and 500 more await attention.

A collection of 102 sheets of plants was received from Calcutta, but, owing to press of work, none have been sent in return. About 250 sheets have, however, been prepared for this purpose and will be forwarded as soon as they can be dealt with.

7. On the initiative of the Officiating Reporter on Economic Products to the Government of India, considerable attention has been paid to the different varieties of sorghum grown in the Presidency. Altogether 94 sets of sorghum heads have passed through the office for transmission to Calcutta, duplicates being retained in all cases for future reference.

8. The Superintendent of the Royal Botanical Gardens in Calcutta and the Reporter on Economic Products having decided to work up the varieties of yams, wild and cultivated, throughout India, the somewhat delicate task of forwarding living specimens of the tubers for growth in the Calcutta gardens devolved on this office. Fifty baskets of these have been despatched during the year. The importance of having such sendings passed through a Central office may be gathered from the fact that many have had to be rejected because of small size, decay *en route*, or because they were not yams at all but tuberous plants of other orders.

9. An attempt has been made to collect information regarding the wild indigos of the Madras Presidency. It is supposed that among these there is one at least of great economic value, and the search has been commenced for it. A number of plants have already been received in this office, but, since their state of preservation on arrival has been almost uniformly bad, little progress has been made in the enquiry. Such indigos as the Government Botanist was able to collect on tour have been carefully examined and sent for checking to the Superintendent of the Royal Gardens in Calcutta, and several interesting species have been found among them. The cultivated forms so far collected have been uniformly referred to *Indigofera sumatrana*, and not to *Indigofera tinctoria* as had been supposed.

10. The sandalwood plantations of Mysore and Coorg have recently developed a new and alarming disease called "spike". In this the plant slowly or rapidly alters the character of its foliage, the leaves becoming smaller and less numerous as the disease advances. Ultimately the affected plant dies out altogether. Large areas where the sandalwood was formerly abundant are now completely devoid of these trees, the disease having made a clean sweep of them. The sandalwood of commerce is entirely collected from dead trees. While therefore the visible supply is not likely to decrease during the next few years and might indeed be greatly increased with little difficulty, there is some prospect of this profitable source of revenue being lost to the State. Considering the importance of the product, the Government Botanist was lent to the Government of India to examine the plants *in situ*. No trace of any parasite was found in the tissues, but a number of interesting facts were brought to light in the investigation, the report on which was reproduced in the Indian Forester.

11. A fortnight was devoted to an examination of the pepper plantations of the South Wynaad. After some years of phenominal success, many of the vines are seen to be dying out. A number of diseases were met with, but there was no *one* which was universally found. The plants were extremely liable to cankerous growths, and in some cases severe attacks of eelworms on the roots were met with. In certain vines a hyphal infestation was found throughout the vessels in the fibrovascular bundles, but the presence of this fungus did not appear to have any relation to the relative "sickness" of the vines. A preliminary report was issued and the investigation postponed until the Government Botanist should have the opportunity of examining the plants during the dry weather.

12. The cockchafers of the Nilgiris continued to receive attention, although the completion of the work was interfered with by the removal of the Government Botanist's office to Madras.

13. By far the most important economic work of the year was that in connection with the Samalkot experimental sugar station. The complete management of this passed into the Government Botanist's hands on 28th April, and throughout the year its affairs have occupied much of his time.

In spite of the hurried manner in which the land was acquired, and the lateness of the time of planting, the year's work may be considered generally as successful. A change was unfortunately necessary in the Agricultural Inspector in charge, and the land proved in most cases to be in very poor physical condition, but the growth of the canes was, on the whole, satisfactory. Some of the fourteen varieties showed remarkable growth, and the results obtained from the "methods" plots were interesting. The manurial plots were on the other hand of little value, in that the physical condition of the soil was quite unfit for this line of work. A second large piece has been taken up, a number of varieties have been added to the station, the manurial experiments have been simplified, while the different methods of growing the cane have received far greater attention. At the close of the official year the whole station was planted up and over 100 experiments were being carried out in sixty separate plots. The work of reaping the crop and planting the station up was very heavy, and the bulk of the office staff were employed during the month of March in the necessary counting and weighing operations. The varieties grown were analysed through the kindness of Messrs. Parry & Co. at the Deccan Factory. As was perhaps to be expected at first, the local varieties proved to be superior to those introduced from Bombay and elsewhere. The unoccupied land was laid out in paddy of which several varieties were tried. At the instance of the Deputy Director of Agriculture the short "two-months" paddy of the Tanjore district was successfully introduced and the seed sold to the ryots.

14. A short visit was paid to the sugarcane experimental garden at Vizianagram. Here a number of Mauritius canes have been grown for several years in comparative isolation. These were inspected, and the planting for the current year was superintended by the Agricultural Inspector stationed at Samalkot. By the kindness of the authorities nine of the varieties were planted at Samalkot and subjected to a preliminary analysis, forming a valuable addition to our set of varieties there. It is proposed to pay occasional visits during the year to this interesting little garden.

15. An important innovation in the usual touring arrangements was made, in that a tract of country was selected for detailed agricultural examination. The Government Botanist toured for about six weeks through the upland taluks of the Kistna district, studied the crops and modes of cultivation and collected examples of the various pests.

The chief crops thus submitted to detailed study were indigo, chillies, cotton, cholam, maize, tobacco, dry paddy, sazza, korra, white variga, the various grams and other crops were also noted where met with. It is proposed to devote one tour each year to the study of the crops of a district in this manner.

Among the many fungus and insect pests collected during this tour, perhaps the most interesting was a Colletotrichum so closely allied to the existing species attacking the sugarcane that it was not possible to distinguish the two under the microscope. It was abundant on dying cholam leaves and appeared to be saprophytic. It is probably widely distributed, and, if so, attempts to stamp out the sugarcane disease must take the proximity of cholam into account. The matter has been referred to the Cryptogamic Botanist to the Government of India. Most of the remaining pests have been merely "recorded" in the office collections until such time as may allow of their being worked out in detail.

16. During the year under review the following additions were made to the office staff. An entomological assistant, an artist, an additional plant-collector and an extra peon. These officers, who joined at the commencement of March were employed during that month at the Samalkot sugar station, the artist making careful paintings of all the varieties of sugarcane grown.

17. No useful purpose would be served by giving references to the many minor matters which have engaged the Government Botanist's attention during the year. Suffice it to say that the number of subjects brought before him was far in excess of what could be properly dealt with, and the wideness of the field of study has never been more keenly felt than during the period under review.

MADRAS,
13th June 1903.

(Signed) C. A. BARBER,
Government Botanist.

APPENDIX II.

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT, MADRAS.

I have the honour to submit a report on the work done by the Civil Veterinary Department, Madras, during the official year 1902–1903.

2. I continued to be in charge of the department throughout the year. For 128 days I was on tour, and at Saidapet Agricultural College I delivered lectures in Veterinary Science for over fourteen days. In obedience to instructions of the Board, I had been to Mysore to select elephants for the Agency of Gódávari district, and afterwards visited Berhampur to examine an elephant of the Police Department.

During the year my attention was chiefly directed in drawing up a scheme for the organization of a Veterinary College at Madras, and it is expected that Madras will soon be in possession of one.

I interviewed the Collector of Madura regarding the reintroduction of the Glanders and Farcy Act in the Madura district, but for want of professional men the matter was left in abeyance. During the latter part of the official year I was with Mr. Stockman supervising the progress of the rinderpest experiments.

3. *Pony-breeding.*—(*a*) There were twelve pony and four donkey stallions at the commencement of the official year. In Coimbatore there were eight and in Salem four pony stallions. Three of these stallions were lent to private breeders and stallion Euphrates, which was suffering from confirmed paraplegia since the commencement of the year, was destroyed on the 14th July 1902. There were therefore only eight stallions at work—six in Coimbatore and two in Salem. At the end of the year in March four new pony stallions were purchased by me at Bombay. The health of the stallions during the year was good, excepting stallion "Baby", which is now under treatment at Madras for lameness. This stallion was unfit for work for the greater part of the year.

Another stallion "Hector," at Kollegal, had to be removed from that place to Pollachi, where he has been working since owing to prevalence of plague in the suburbs of Kollegal. Had it not been for this unavoidable transfer the work of this stallion would have been much better. The stallion "Abdullah" is old and, under my instructions, he was given only light work. In Coimbatore district there were 224 coverings as against 314 in the preceding year. This gives an average of 32 per stallion.

The work was actually commenced only after the middle of June. The decrease in the number of coverings is mainly due to the reasons quoted above and also to the fact that only approved mares that are in season are allowed service and the services are given to those mares which are brought by the owners voluntarily. It must also be understood that the number of stallions in stud was below the number in the previous year.

(*b*) In Salem district stallion "Jumna" was lent to a planter on the Shevaroy Hills and another to the mittadar of Pagalpatti. These stallions did excellent work, though the number of coverings may be considered small. Only one stallion "Tigris" continued to work in the Salem sub-division where there used to be in former years at least three stallions. This is again attributed to the prevalence of plague in these parts. He was removed for a short period to Berikai, but as plague broke out at this place also he was brought back to Hosúr.

Stallion "Sunshine" was stationed at Harúr in Salem taluk where for the first time pony-breeding operations were introduced. Many of the ryots are reported to be ignorant of the object with which these operations are undertaken by Government and some of them are of the belief that the foals when dropped become the property of Government.

Still some of the ryots have purchased mares solely for breeding purposes, and it is satisfying to note that most of the mares covered during the year are said to be in foal. One drawback is the ignorance of these owners as to the proper time of service. They regulate it not by the time the mare actually comes into season but by the phases of the moon. It is proposed to issue general instructions in this matter. The total number of coverings in the Salem district is 128 as against 111 in the preceding year. The comparatively small work is due to bad season and the care that is taken in allowing only mares in season. But the stoppage of the pony shows

accounts in a large measure for the apparently poor work of the pony-breeding operations. A report regarding the prospects of the pony-breeding operations and the manner in which the operations should be conducted was submitted to the Board. Hitherto the progress of pony-breeding operations has been estimated by the number of coverings. This is a mistake. The progress should be estimated by the results of the foals dropped. It is anticipated that the system now adopted will show considerably better results and the owners will not be subjected to the annoyance and worry of periodical inspections of their mares.

During the year I interviewed the Collector of Bellary and the zamindar of Tuni. In the former place there is considerable scope for extending the operations, but owing to the appearance of plague the experiment had to be postponed. In Tuni the zamindar owns a large number of suitable mares and it could be tried there with great success. The matter was however not taken up for want of a stallion. The subjoined statement will show where the Government stallions were located and also the work done by each. The average number of coverings per stallion was 32 as against 35·4 in the previous year :—

Coimbatore district.

Number and name.		Number of coverings.	Place where worked.
6	Abdullah	31	Karúr, Kángayam.
11	Parel	28	Palladam.
15	Selim	30	Erode.
17	Hector	40	Kollegal, Pollachi.
18	Baby	19	Aravakurchi, Karúr.
19	Nile	28	Pollachi, Dhárápuram.
22	Ophir *	48	Kángayam, Palayakottai.
		224	

Salem district.

7	Carbon †	32	Pagalpatti.
13	Sunshine ‡	29	Dharmapuri (4), Harúr (25).
20	Tigris	40	Hosúr.
23	Jumna	27	Dharmapuri (17), Shevaroys (10).
		128	

(*c*) *Results of coverings of previous year.*—Four hundred and twenty-five mares were served, of these 101 cases proved successful including 18 mares that aborted, and 76 cases were not ascertained. This gives a percentage of 23·8 of successful coverings. The remaining contains 239 empty cases and nine casualties. Of the cases not reported, 61 were enquired into, but the mares were not forthcoming and the remaining certificates were not returned by the Revenue authorities, to whom under recent orders the work of ascertaining these results has been transferred.

4. *Mule-breeding.*—Out of the four stallions, one was stationed at Kollegal, Coimbatore district, two in Hosúr, Salem district, and one was lent to Devanhalli farm, Mysore. These stallions were sold by public auction during the year and the proceeds were debited to Government. There had been 113 coverings for all the stallions and it may not be necessary to write details as mule-breeding operations were finally abandoned—G.O., No. 626, Revenue, dated 18th July 1902. In the previous year there were 97 coverings for the same four stallions, and the results were ascertained in 61 cases only. It is reported that 19 foals were dropped.

5. *Castration.*—In the Coimbatore district there was only one salustri at work, and he castrated 31 entires against 56 in the preceding year. The one that was working in the previous year resigned his appointment owing to ill-health, and the present incumbent was transferred from Salem. The decrease in the number of castrations is due to the fact that the salustri was required to remain with stallion "Baby" at Aravakurchi for four months.

In the Salem district 34 entires were castrated and there also there was only one salustri. The number of castrations in the previous year was 82, but this was the work of three men.

During the year one more was added to the staff.

6. *Cattle-breeding.*—I travelled through all the important breeding centres in the Northern Circars, in the Kurnool and in the Nellore districts; first, for obtaining materials for the monographs of the different typical breeds for the information of the Inspector-General, Civil Veterinary Department, and secondly, to ascertain the custom that is prevalent in those parts for raising good breed of cattle. My report on the subject is under preparation, but from my experience I may be permitted to state that some help should be given by Government in this matter. Yearling and two-year old young bulls should be purchased of the very best type and distributed among the herds of the best breeding localities. In Nellore, particularly in the

* Lent to the pattagar. † Lent to mittadar from 8th July 1902. ‡ Left Dharmapuri on the 13th July 1902.

Ongole taluk, excellent cattle are bred and the zamindars recognise the value of placing none but the best bulls in their herds; but elsewhere common bulls are considered good enough. I would submit that Government should purchase a few young bulls of the typical breeds, brand them with a serial number, and turn them loose among herds of other localities than those from which they have been purchased, but they should be kept in the same district.

The Madras breeds of cattle are known to be excellent and in order to preserve their traditional value, it should be our object to secure good bulls at important centres and, indeed, in all districts. Only a small sum will be required annually and, considering the advantages to be derived by the agricultural population in general, the money would be well spent.

7. *Cattle Fairs.*—Tinnevelly was the only district in which cattle fairs were held during the year. One of the Assistants was always on duty at these fairs and his duty was to assist the Revenue officials in carrying out the provisions of the Cattle Disease Act. At all these fairs the Act was enforced and there were no cases of disease among the cattle that were presented for sale.

The reports of the Assistants on the cattle fairs were forwarded to the Collector of the district. They complained that the arrangements for cattle and people were generally defective.

The cattle fairs in the other districts are perhaps stopped owing to the danger of persons proceeding there from the infected areas. I attended the cattle fair at Azhvár Tirunagari, but the majority of the cattle had disbursed before I arrived there and which was unusually earlier. The list of cattle fairs at which the Act was enforced is furnished below under a separate paragraph.

8. *Cattle Disease.*—(*a*) Appendix "F" gives a summary of the figures for five years and "G" for the current year for each district.

(*b*) On the whole there were 88,976 deaths among cattle from diseases. Of these a vast majority is put down under unspecified diseases. Though the figures point to a slight decrease numerically, yet the loss was almost the same as last year. It was suggested last year that diarrhœa and dysentery should be included under rinderpest, but the question was not touched by the Board.

In this Presidency as elsewhere rinderpest and anthrax are excessively severe and particularly in the Ganjám and the Gódávari districts. Inoculation was tried during the year for both rinderpest and anthrax, but only on a small scale. Separate reports were submitted to the Board regarding these inoculations with particulars of cattle inoculated. The method is simple and inoffensive and consequently there was no opposition. The cattle-owners were perfectly willing to have their cattle inoculated. A comparatively large amount of work could have been shown if I had more Assistants and more facilities of obtaining the serum especially for anthrax.

(*c*) The deaths from anthrax were markedly lower than in the previous year, and the majority of deaths was reported from Gódávari, Tanjore, South Arcot and Nellore as in the preceding year, with the exception of Chingleput district, which appears to have been almost free from this disease. There, however, epizootic aphtha did considerable havoc and young calves, which are more susceptible to this disease, were carried away in large numbers. This is greatly due to neglect as the disease is amenable to treatment, and only an extremely small percentage of attacks generally end fatally. The deaths from epizootic aphtha during the year were more than twice the number reported in the preceding year and the largest on record for the past five years. Chingleput, North and South Arcot districts alone contributed more than half of the total number of deaths.

(*d*) Under other causes 13,117 deaths were reported including 71 cases from criminal poisoning. The cases reported under criminal poisoning have always to be received with certain amount of suspicion, as generally subsequent reports reveal that they had been either wrongly classified under that head, or they are not traceable, generally the former. This only goes to show that no pains are taken to furnish correct information.

The statistics on cattle mortality are reviewed every quarter, and I have therefore very little more to add to this report.

9. *Veterinary Dispensaries.*—There are only two dispensaries at present in this Presidency: one is attached to the Saidapet Agricultural College and the other to the District Board of Trichinopoly. To the former, when I am at Madras, I make weekly visits and the latter was twice visited by me during the year under report. This commenced work regularly from the 18th February 1903 and has been well organised under a local committee. The premises are spacious and situated next to the cattle mundi. Although it was only started on the 18th February 1903, it has already become popular and advantage is being taken of it by cattle-owners and Ekka proprietors. It was suggested that efforts might be made to start similar dispensaries in the Madura, the Bellary and the Coimbatore districts. The Collectors of these districts were completely in favour of establishing these institutions, but owing to the difficulty of procuring qualified men I submitted to the Board to defer the consideration of the question. I also inspected Rajahmundry and Pithápuram of the Gódávari district to consider what advantages existed for starting veterinary dispensaries at these two places. The latter place I visited at the request of the Court of Wards. A passed student of the Lahore Veterinary College has been obtained for charge of this dispensary. Rajahmundry is also a suitable place in which to establish an institution of the kind. There are a large number of places where these institutions may be started with advantage, but to get proper men it will be necessary to wait

until they have been trained at the Madras Veterinary College. In the meantime the one or two institutions that are now at work will serve as tests to judge how far their benefits are accepted by the ryots. In order to ensure their proper working it may be desirable to bring them in closer contact with the Superintendent of the Civil Veterinary Department regarding their professional work, and the Court of Wards will be asked to permit this officer to make periodical inspections when he is in the neighbourhood of these institutions.

To this effect I intend submitting proposals separately for the favourable consideration of Board.

10. (*a*) The department consisted of three Veterinary Assistants during the year, of whom one was appointed on the 10th June 1902. One of the Assistants, V. P. Subramania Mudaliyar, was primarily employed in the inspection of the pony-breeding operations, to which the major portion of the time, *i.e.*, 8½ months, was devoted. It was considered necessary to utilise his services for the inspection of cattle fairs also whenever the services of either of the other Assistants could not be spared. During the year he attended in addition to his duties in connection with pony-breeding operations the cattle fair at Kalugumalai, Tinnevelly district, where the Cattle Disease Act was enforced and also investigated a large outbreak of foot-and-mouth disease in the Chingleput district; and while Mr. Stockman was conducting his second series of experiments with rinderpest serum at Ongole, he was detailed there to receive some practical instruction in the manipulation of instruments in connection with inoculation. His work in connection with pony-breeding operations consisted in supervising the work of the stallions, their condition as well as the checking of the results of the coverings of the previous year which has subsequently been transferred to the Revenue authorities—*vide* G.O., Mis. No. 676, Revenue, dated 21st March 1903. He however inspected in all 114 cases during the year.

(*b*) M. Hassan 'Alí Ṣáḥib was for the most part of the year on cattle fair duty and he was deputed to the following cattle fairs at the request of the Collector of the Tinnevelly district:—

Kálugumalai.	Azhvár Tirunagari.
Sivalaperi.	Muthulapuram.
Kanniseri.	Sankaranayinárkóyil.

While attending these fairs opportunities were taken by him to inspect the several ponies plying in the dawk lines in the Tinnevelly district in order to ascertain if there were cases of glanders, and he reported that the animals were free from disease. His presence at Palamcottah and Tuticorin was made use of by the municipal authorities of these places for inspecting the conservancy bullocks which were suffering from disease.

At the instance of the lessees of Sivaganga, he was sent to Sivaganga for a few days in May to render them professional help in treating certain disease which was then prevalent among their horses. His diagnosis revealed that two of their animals were suffering from paraplegia.

He further investigated an outbreak of anthrax that was reported from Conjeeveram and Ponnéri taluks of the Chingleput district and proceeded to Ootacamund to report on an outbreak of rinderpest; but in the former place ryots complained that the time of the year was not suitable for carrying out the inoculations and he was obliged to return. He, however, explained to them the efficacy of the new treatment and enlisted their co-operation for a future occasion. In the latter place the disease subsided when the Veterinary Assistant actually went there.

(*c*) H. C. Sampathu Aiyangar, who was intended to assist the Superintendent in carrying out the prophylactic experiments with serum on joining his appointment, was ordered to work under Hassan 'Alí Ṣáḥib at two of the cattle fairs in order he might learn the duties connected with the management of these fairs and afterwards he was engaged for about two months in inspecting the dawk lines in the Madura and Tinnevelly districts to detect if there were cases of suspected glanders. His report was that in the absence of Mallein test it was not possible to assert precisely that glanders existed, though he noticed several animals suffering from ulcers which, however, is one of the symptoms of the disease. He accompanied the Superintendent to the Northern Circars, Nellore and Kurnool districts in order to inspect the local breeds of cattle, while at the same time he also advised the ryots on the treatment of simple diseases among cattle and also on the benefits conferred by inoculation in cases of rinderpest and anthrax. When he visited Gódávari district anthrax was prevailing in Tanuku taluk, and though the ryots were ready to submit their cattle for inoculation, yet for want of serum nothing was done, except advising them as to the sanitary precautions that they should observe at the time of an outbreak of contagious disease. For the same reason inoculation was not carried in Tiruvallúr taluk of the Chingleput district. Subsequently serum was obtained from the Muktesar laboratory, and he inoculated about 117 cattle in Bápatla taluk and in a village in Ongole taluk bordering on Bápatla; and in Srívaikuntam taluk where I was also present he inoculated another 260 cattle for anthrax.

In the end of December last Mr. Stockman arrived at Madras and two Assistants were first sent with him to Berhampur for the conduct of the experiments which was sanctioned by the India Government, and they were employed with him till the end of the official year. Their duty consisted in taking the temperature of the animals inoculated both morning and evening and assisting him generally in the conduct of the work. While at Ongole, Subramania Mudaliyar was detailed and Hassan 'Alí Ṣáḥib continued to remain at Berhampur to settle the accounts in connection with the experiments and deliver over the cattle to the owners as they recovered from the effects of these experiments.

11. Veterinary Assistants Subramania Mudaliyar and Hassan 'Alí Ṣáhib were on privilege leave for two and one and-a-half months, respectively, during the year.

12. The statements J, K, L and O are blank for the year under report.

CAMP, KANGAYAM,
27th June 1903.

(Signed) W. D. GUNN, Vety.-Major,
Superintendent.

APPENDICES.

MADRAS FORM A.

RETURN of pony and donkey stallions for the official year 1902–1903.

		Pony stallion.	Donkey stallion.
Balance on 1st April 1902		12	4
Increase ..	Purchased	4	..
	By transfer from	..	..
	Total ..	* 16	4
Decrease ..	Died	..	..
	Destroyed	† 1	..
	Sold	..	4
	Total ..	1	4
Balance on 31st March 1903		15	..

* Arab ponies. † For confirmed paraplegia on the 14th July 1902.

MADRAS FORM B.

RETURN of pony and donkey stallions struck off the list during the official year 1902–1903.

Name.	Class.	Why struck off.	If sold, price realised.
1. Kachora	Country-bred ..	Mule-breeding operations were abandoned—G.O., No. 626, Revenue, dated 18th July 1902.	No. 1 was sold at Madras for Rs. 40.
2. Angoor	Do. ..		Nos. 2, 3 and 4 were sold at Bangalore for Rs. 215.
3. Shimroli	Persian		
4. Cyprus	Arab		

MADRAS FORM C.

RETURN of services and produce of pony and donkey stallions during the official year 1902–1903.

	Number at stud.		Number of mares covered.		Average of mares covered per stallion at stud.		Results of previous year's covering.			Average result of previous year's covering per stallion at stud		
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Number of produce.	Number not held.	Number not known.	Average of produce.	Average of not held.	Average of not known.
1	2	3	4	5	6	7	8	9	10	11	12	13
Ponies ..	11	12	352	425	32	35	101	239 †	76	8	2·0	6
Donkeys ..	4	4	113	97	28	24	19	13	30	6	* 4	* 10

* The average is calculated for three stallions only. The results of coverings effected by "Cyprus" at Devanhalli are not ascertainable.

† Excluding the nine died.

MADRAS FORM D.

RETURN of cost of feed, keep, attendants, etc., of pony and donkey stallions during 1902–1903.

District.	Number of stallions.		Total annual cost.		Average cost per stallion.		Remarks.
	Pony.	Donkey.	Pony.	Donkey.	Pony.	Donkey.	
			RS. A. P.	RS. A. P.	RS.	RS. A. P.	
Coimbatore ..	8	1	* 1,933 0 4	285 12 4	242	285 12 4	* Includes feed, keep, etc., of stallion Euphrates for a part of the year, *i.e*, up to the middle of July.
Salem	4	3	† 973 13 6	690 13 9	243	230 0 0	† Excludes feed, keep, etc., of stallion lent to Mr. Morgan of the Carrara estate for two months.

MADRAS FORM E.

RETURN of ponies castrated by Veterinary Assistants and Salustris during 1902–1903.

District.	Number of ponies castrated.	Number of known deaths from effects of castration.	Remarks.
Coimbatore	31	None.	These entires were castrated by salustris. There is one in each district.
Salem	34	Do.	

MADRAS FORM F.

COMPARATIVE statement on cattle mortality for five years ending 1902–1903.

Causes of death.	1898–99.	1899–1900.	1900–1901.	1901–1902.	1902–1903.
Diseases.	NO.	NO.	NO.	NO.	NO.
Rinderpest	21,739	19,623	16,052	9,034	8,167
Diarrhœa and dysentery	20,853	14,439	11,326	9,610	8,388
Anthrax	17,318	16,480	16,106	18,215	13,496
Malignant sore-throat	3,873	6,089	7,341	7,662	9,063
Black quarter	1,170	1,621	2,482	2,421	2,989
Epizootic aphtha	3,725	3,038	5,283	4,722	11,456
Variola	..	..	..	..	..
Others	38,770	40,239	38,951	37,333	35,417
Total ..	107,448	101,529	97,541	88,997	88,976
Other causes.					
Snake-bite	2,056	2,019	2,028	1,761	2,109
Wild animals	11,370	11,840	11,564	10,811	10,937
Criminal poisoning	49	74	47	34	71
Total ..	13,475	13,933	13,639	12,606	13,117
Grand total ..	120,923	115,462	111,180	101,603	102,093

MADRAS FORM G.

STATISTICS of mortality among cattle, horses and ponies in the several districts of the Madras Presidency for the official year 1902–1903.

Districts.	Number of deaths among Cattle: From diseases. Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.	Total stock by the latest census.	Horses and ponies: From diseases. Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Ganjám ..	3,230	1,525	765	811	189	903	1,779	9,202	63	260	..	323	9,525	123,753	2	5	6	13	..	..	..	..	13
2. Vizagapatam ..	983	769	608	522	298	278	1,083	4,541	36	102	2	140	4,681	128,721	..	..	1	1	..	..	..	..	1
3. Gódávari ..	834	1,235	3,150	785	145	116	4,822	11,087	199	214	8	421	11,508	..	3	6	16	25	..	3	..	3	28
4. Kistna ..	348	648	746	1,569	205	367	2,260	6,143	188	151	12	351	6,502	1,105,431	2	2	10	14	..	11	..	11	25
5. Kurnool ..	300	247	693	286	217	82	4,196	6,021	99	398	1	498	6,519	176,229	..	2	42	44	1	17	..	18	62
6. Bellary ..	52	231	305	263	273	20	3,669	4,813	22	155	..	177	4,990	502,360	1	4	45	50	..	2	..	2	52
7. Anantapur ..	68	396	508	249	254	151	2,549	4,175	20	304	6	330	4,505	1,157,178	1	..	13	14	..	11	..	11	25
8. Cuddapah ..	349	248	419	241	531	150	1,439	3,377	64	729	1	794	4,171	942,078	2	2	2	6	..	7	..	7	13
9. Nellore ..	393	254	831	607	180	64	3,580	5,909	182	159	..	341	6,250	204,955	2	..	7	9	..	..	..	..	9
10. Chingleput ..	49	187	329	145	12	1,798	345	2,865	159	9	..	168	3,033	662,698	1	..	1	2	1	..	..	1	3
11. South Arcot ..	121	242	1,413	778	168	2,160	2,731	7,613	198	410	..	608	8,221	1,163,062	..	1	2	3	..	..	..	..	3
12. North Arcot ..	86	183	193	94	91	2,960	388	3,995	140	683	17	840	4,835	801,815	..	..	..	..	2	..	..	2	2
13. Salem	44	163	143	99	64	310	543	1,357	56	248	..	304	1,661	912,587	..	..	4	4	2	..	..	2	6
14. Coimbatore ..	70	251	248	214	198	290	1,465	2,736	54	750	15	819	3,555	1,151,637	3	..	31	34	1	25	1	27	61
15. Trichinopoly ..	271	101	202	204	9	447	1,598	2,832	42	40	..	82	2,914	609,139	.	..	10	10	..	..	..	..	10
16. Tanjore ..	470	198	1,650	1,113	34	923	549	4,937	202	4	1	207	5,144	936,740	..	..	2	2	..	..	..	..	2
17. Madura ..	197	445	494	360	37	223	909	2,665	126	108	..	234	2,899	695,008	6	5	14	25	2	8	..	10	35
18. Tinnevelly ..	276	356	664	405	2	101	1,344	3,148	158	71	1	230	3,381	482,925	1	..	4	5	..	..	..	..	5
19. The Nilgiris ..	..	14	88	92	8	5	2	209	1	517	..	518	727	64,850	..	..	1	1	2	13	..	15	16
20. Malabar ..	26	686	40	202	59	108	118	1,239	96	1,856	7	1,959	3,198	908,983	1	..	..	1	..	..	..	..	1
21. South Canara ..	..	9	7	33	15	..	48	112	4	3,769	..	3,773	3,885	1,351,700	..	..	..	..	..	..	..	..	..
Total ..	8,167	8,388	13,496	9,063	2,989	11,456	35,417	88,976	2,109	10,937	71	13,117	102,093	..	25	27	211	263	11	97	1	109	72

MADRAS FORM H.

RETURN showing the Provincial cost of the Civil Veterinary Department during 1902–1903.

Imperial.	Provincial.								
Salary and exchange compensation allowance of Superintendent, Civil Veterinary Department.	Prizes at horse fairs and shows.	Establishment.		Travelling allowances.		Contingencies.	Purchase of stallions.	Stable, feed and keep.	Total Provincial.
		Officers.	Subordinates.	Officers.	Subordinates.				
1	2	3	4	5	6	7	8	9	10
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Salary—		C.V.D.	C.V.D.	C.V.D.	C.V.D.	C.V.D.			C.V.D.
13,838 11 4	..	3,455 5 8	1,022 15 0	4,659 9 6	277 3 0	1,978 12 1	..	..	11,974 7 7
E.C.A.—		580 10 4							
862 8 0		(house-rent).							
			P.B.O.		P.B.O.	P.B.O.	P.B.O.	P.B.O.	P.B.O.
			396 14 8	..	20 2 9	* 178 4 1	2,500 0 0	2,906 13 10	6,222 8 6
						† 220 5 2			
	M.B.O.							M.B.O.	M.B.O.
	150 0 0							976 10 1	1,126 10 1
Total 14,701 3 4	..	..	..	..	..	..	..	..	19,323 10 2

* Keep of ponies whilst under castration. † Petty construction and repairs.

MADRAS FORM M.

SHOWING results of preventive inoculation during the year 1902–1903.

Province.	Against rinderpest.					Against anthrax or other diseases specifying disease under separate heads.				
	Number of outbreaks in which inoculation was undertaken.	Number of animals (if ascertainable) which died uninoculated in course of outbreak.	Method of inoculation followed.	Number of animals inoculated.	Number which died after inoculation.	Number of outbreaks in which inoculation was undertaken.	Number of animals (if ascertainable) which died uninoculated in course of outbreak.	Method of inoculation followed.	Number of animals inoculated.	Number which died after inoculation.
1	2	3	4	5	6	7	8	9	10	11
Madras	None.	None.	None.	None.	None	3	72	Serum alone.	* 117	None reported.
						3	163	Method.	* 260	Do.

* Revised figure.

MADRAS FORM N.

SHOWING total strength of subordinate Veterinary Staff employed during 1902–1903.

Province.	Paid from Provincial or District Funds.	Number of Veterinary Inspectors.	Number of Veterinary Assistants			
			Employed in veterinary dispensaries.	Employed in work connected with horse and mule breeding.	Employed in work connected with cattle-breeding and cattle disease.	Total.
1	2	3	4	5	6	7
Madras	Provincial ..	3	..	1	2	3
	District ..	1	1	..	..	1

Resolution—Mis. No. 2543, dated 29th July 1903.

The Board begs to submit to Government its report on the operations of the Department of Agriculture during 1902–1903.

2. The orders issued in G.O., No. 582, Revenue, dated 5th July 1903, have been followed in the preparation of the report.

(True Extract.)

(Signed) V. K. RAMANUJACHARI,
Acting Secretary.

To the Secretary to Government, Revenue Department with report.

Order—No. 990, Revenue, dated 28th September 1903.

Miscellaneous.

The report deals with the work of the Agricultural Department in all its branches, the reports of the Government Botanist and of the Superintendent, Civil Veterinary Department, being printed as appendices.

2. The experimental farms at Bellary and Koilpatti were still in the preparatory stage and it is too early to look for results. The experiments made in growing ragi on ridges are however promising: and those to be undertaken in the hybridization of indigenous with imported varieties of cotton may prove of great importance. The report on the sugar station at Samalkot tends to show that the local canes are richer in sugar than the imported varieties. But, as Mr. Barber points out, it will take some years to determine the true value of the foreign kinds.

3. The many minor investigations and experiments referred to in the report indicate the wide scope of the work before the Department. The Government hope, now that a beginning has been made, that it will be practicable to find the men and the funds necessary for the proper development of a Provincial Department of Agriculture.

4. *Civil Veterinary Department.*—After several years of unsuccessful effort it has been decided to abandon departmental mule-breeding operations. The work of the Civil Veterinary Department in this Presidency will, for the future, be mainly directed towards combating cattle disease. An institute has recently been opened in Madras where instruction in Veterinary Science and practice will be given to students with the object chiefly of obtaining a supply of qualified subordinates for the charge of rural Veterinary dispensaries. The course of instruction will extend over three years, so some time must elapse before such dispensaries can be opened on any considerable scale. In the meantime, however, as the present report shows, there is some scope for useful work in popularising methods of inoculation. Attempts to improve the breed of country ponies will be persevered in under the advice of Major Gunn whose proposals to try new centres, to circulate leaflets among the ryots, and to place the stallions in charge of Tahsildars have been approved.

(True Extract.)

(Signed) M. HAMMICK,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement, Land Records and Agriculture).
,, the Educational Department.
,, the Inspector-General of Agriculture (three copies).
,, the Minister of Agriculture, Argentine Republic.
,, the Entomologist to the Government of India.
,, M. Chailley Bert.

Endorsement No. 990A.

Copy to the Government of India, Revenue and Agricultural Department.

(Signed) N. E. MARJORIBANKS,
Under Secretary to Government.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY.

FOR THE OFFICIAL YEAR

1903-1904.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1904

Maximum number of pages prescribed—

Agricultural Report	7	21
Government Botanist's report	4	
Civil Veterinary Department's report ...	10	

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REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1903-1904.

I.—PREFATORY.

The post of Director of Agriculture was held by the Hon'ble Mr. C. J. Weir, I.C.S., until the 21st October 1903, on which date the Hon'ble Mr. A. E. Castlestuart Stuart, I.C.S., took over charge. M.R.Ry. C. K. Subba Rau continued to be in charge of the office of the Deputy Director of Agriculture till the 22nd July 1903 during the absence of Mr. C. Benson on leave; and from that date till the end of the year Mr. Benson was on duty. The office of the Superintendent, Civil Veterinary Department, was held throughout the year by Major Gunn and that of the Government Botanist by Mr. Barber.

2. In June 1903 the Hon'ble Mr. C. J. Weir visited the Samalkota experimental station. In December following, the Hon'ble Mr. Castlestuart Stuart visited the Rev. Mr. Andrew's pumping irrigation station at Melrosapuram in company with the Inspector-General of Agriculture and the Director of Public Instruction. M.R.Ry. C. K. Subba Rau, while in charge of the office of the Deputy Director of Agriculture, paid the usual visits to the Bellary and Koilpatti farms and the Government fibre plantation at Hindupur, and toured in several districts in connection with the reclamation of alkaline soils, saltpetre experiments and the extraction of plantain fibre. Mr. Benson, besides inspecting the farms and plantation from time to time, toured in the Gódávari, Coimbatore, Madura and Tanjore districts in connection with the selection of sites for additional experimental farms and the reclamation of alkaline lands and for the purpose of conferring with the Tanjore Agricultural Association. He also accompanied the Inspector-General of Agriculture in his tour of agricultural enquiry through this Presidency. He attended, along with Mr. Barber, a conference of Agricultural officers from various parts of India held at Poona and other places in the Bombay Presidency.

II.—SCIENTIFIC AND NATIONAL ENQUIRY UNDER IMPERIAL DIRECTION.

3. *Geology.*—The annual report of the Director, Geological Survey, has not yet been received.

4. *Entomology.*—Specimens of locusts which appeared in the Hospet taluk, Bellary district, and of moths which damaged castor oil plants (*Ricinus communis*) in a few villages of the Kudligi and Bellary taluks in the same district were forwarded to the Reporter on Economic Products or the Superintendent, Indian Museum; and it was ascertained that the locusts belonged to the species *Acridium Succinctum* Linn and the moths on the castor plants to the species of *Noctuid Ophiusa Melicerte* and *Achaea Melicerte.*

5. *Imperial Institute.*—The Department continued to supply specimens of economic products to the Reporter on Economic Products. Specimens of 75 products were forwarded to him during the year, as also the seed of different kinds of crops grown in this Presidency and additional specimens of yams (*Dioscoreas*). Other articles forwarded to him were different kinds of chillies for transmission to one of his correspondents for experimental cultivation, and musli tubers for cultivation in the Royal Botanical Gardens at Sibpur for clearing up doubts as to the plants to which the roots were attributed.

6. A small quantity of the seed of cloves was forwarded through the Inspector-General of Agriculture to the Director of Land Records and Agriculture, Assam, for cultivation. At the instance of the Inspector-General, seeds of some typical indigenous varieties of cotton were forwarded to Hull, England, in order that their value might be tested for oil and oil-cake (both decorticated and undecorticated). Arrangements were also made for the supply, to the Inspector-General, of the seed, botanical specimens and some lint of the perennial tree cottons found in this Presidency and, to the Agricultural Chemist to the Government of India, of specimens of the various kinds of oil seeds grown largely in this Presidency, the latter officer being engaged in the investigation of the amount of oil contained in the several oil seeds. A Wardian case containing well-established plants of the varieties of lemon grass grown in Cochin and used in the preparation of lemon grass oil, was forwarded to the West Indies; but as it reached the destination in a bad condition, a fresh consignment has been made since the close of the year.

7. Reports continued to be received during the year from District officers and Conservators of Forests as to the methods of increasing fodder supplies and as to the natural vegetable foods gathered and used by poor people especially in years of scarcity or famine. The reports were forwarded to the Inspector-General and the very large number of specimens of famine foods which accompanied them were forwarded to the Reporter on Economic Products for analyses. Enquiries were also instituted at the instance of the Inspector-General, as to the extent to which margosa (nim) leaves and cake were used as manure in this Presidency and the use and economic value and the manner of extraction of the nim seed oil. The information furnished by District officers has been communicated to the Inspector-General since the close of the year, and experiments have been set on foot at the Samalkota farm to test the manurial value of the nim cake as compared with farm yard manure.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

8. The two Agricultural Probationers, who were receiving practical training in the farms of the Bombay Presidency, returned and were appointed Agricultural Inspectors, and their places were filled by the appointment of new men. The remaining two probationers were sent to Bombay for similar training. The experimental farms at Bellary, Koilpatti and Samalkot continued to be worked during the year.

9. At both the Bellary and Koilpatti farms, the main problem to be solved was the extent to which deep tillage would operate as a remedy for the evil effects of drought. Subsidiary experiments were to be made in the comparative value of various kinds of fodder and various methods of collecting and utilising cattle manure, in seed selection, and in the use of new implements.

In the *Bellary* farm, it has been arranged that comparative experiments should be made on two fields laid out into 18 half-acre plots; but no real experimental work either in deep tillage or in manuring was commenced, as the natural fertility and condition of the several plots had not been fully ascertained. These plots were accordingly sown under the ordinary method of tillage with white sorghum, the main staple crop of the locality; the outturn ranged from 453 to 844 lb. per acre, indicating the inequality of the plots and the great dependence of the crops on the season, which was not favourable. The outturn on the entire area, 24·44 acres, including the two fields, sown with white sorghum was at the rate of 474 lb. of grain, 1,347 lb. of dry straw and 402 lb. of green fodder per acre. As ordinary incidents of farm management, the following crops were grown—Italian millet, on about 17 acres; bengal-gram

on 11·94 acres; tobacco of the Dindigul and Gódávari varieties as well as several indigenous and Java varieties furnished by the Inspector-General; sweet potatoes and chillies. The outturn of the Dindigul and Gódávari varieties of tobacco was not unsatisfactory, having amounted to 956 lb. of cured leaf per acre notwithstanding that the crop was much affected by mildew. The varieties furnished by the Inspector-General yielded a poor outturn. No attempt was made to test the economic value of different *fodder crops* or the various methods of growing them owing to insufficiency of live-stock. What fodder was grown during the year was intended merely for feeding the existing stock. Under *selection of seed*, the work done consisted in the cultivation of eighty varieties of sorghum, the seed of which was furnished by the Government Botanist, and of fifty more supplied by the Inspector-General of Agriculture; but the result was a general failure owing partly to drought in October 1903 and partly to excessive rain in November following; but a trifling amount of seed of some of the varieties has been secured. The Deputy Director of Agriculture has found that there is great risk of confusion in attempting to study too large a number of varieties of the same crop. Under *implements*, the Surat plough was tried and found to work better than the local pattern; and the chaff-cutter supplied by the Inspector-General of Agriculture has enabled the Agricultural department to use up a larger proportion of the harder straws as fodder.

10. At the *Koilpatti* farm, which consists of a block of black cotton soil intended primarily for experiments and of a poor red soil block, which contains a few wells, farm buildings and residential quarters, no experiments in deep tillage or manuring were conducted during the year for the reasons stated under the Bellary farm. The block of black cotton soil having been much neglected for many years before its acquisition by Government, difficulty was experienced in eradicating the hariali grass from some portions of it. It is also subject to the drawback that the surface drainage of higher land to the west flows across a portion of it. Two fields consisting of 8 half-acre and 18 twenty-cent plots, which were prepared for the comparative experiments, were cultivated with cumbu—the staple of the locality—to test their natural fertility. Four of the half-acre plots, which were sown with the drill, yielded 339 lb. of grain and 660 lb. of straw per acre, while the remaining four plots, which were sown broadcast, yielded 391 lb. of grain and 794 lb. of straw per acre. The Deputy Director anticipated a larger outturn on the former set of plots, and attributes the result actually obtained to the want of skill on the part of the farm servants in the use of the drill. The total area sown with cumbu in the farm, including the two fields, was 10·5 acres, the outturn of which averaged 343 lb. of grain and 656 lb. of dry straw per acre. In the red soil block, which is extremely irregular in character, of poor soil and insufficiently supplied with irrigation from wells, a variety of crops were grown as incidents of ordinary cultivation, such as horse-gram, rainfed paddy, kudiraivali (a coarse kind of millet), ragi, samai, tobacco, ground-nut, sweet potatoes, red gram, etc. The following features in the cultivation of this area deserve mention:—

Ragi planted on a plot of about one acre in September 1903 yielded 2,196 lb. of grain, while that planted on another plot of about two acres in October following yielded only 1,177 lb. of grain per acre, indicating the advantage of earlier planting. On the latter plot, one acre planted on the ridge-and-furrow system yielded a larger outturn (1,112 lb. per acre) than that sown alongside on the ordinary flat bed system (778 lb. an acre), showing that the former system is advantageous, besides being simpler to manage and better adapted for cheap inter-cultivation. Sample seeds of two varieties of paddy received from the Inspector-General were sown on quarter of an acre; one of them—*halki*—being fine and white, is considered worthy of a further trial, while the other—*banku*—attracted some notice around the farm on account of (1) its tillering character, which makes it possible to plant it thinly and save seed, and (2) its capability to mature rapidly, which is a recommendation for its growth in places where the rainfall is moderate. Tobacco planted on half an acre of poor land in December 1903 yielded 400 lb. of leaf cured on the local method, but an attempt is being made to improve on the local methods of curing. The varieties of sweet potatoes introduced from Poona appealed to local growers, eleven of whom have been supplied with vines for cultivation.

The fruit trees of the several kinds which were planted in 1902–1903 are promising. Following the practice of the locality, *fodder* sorghum was sown broadcast on about eight acres of the black soil and three acres of the red soil block with the object of cleaning the land. This, however, was only partially successful; and the yield was not satisfactory. The Deputy Director considers that the growth of sorghum for fodder is a very expensive method of producing it. It is, however, superior in quality to the straw of cumbu—the main cereal in the district—and its outturn is also larger; and the question of sowing it early so that it may ripen before cumbu and thus escape the attacks of what are apparently *aphidæ* is engaging attention. In regard to *new implements*, trials were made with small "improved ploughs" which were found economical to work on the red soil; the chaff-cutter was found serviceable as in the Bellary farm; and the drill and scuffler and bullock-hoes used in the Deccan districts were introduced and found useful in saving labour at certain times of the year. The Zamindar of Ettiyapuram was also helped in the use of the drill on his estate.

11. *Sugarcane.*—At the *Samalkot* farm, the area under sugarcane increased from five to eight acres during the year. The season was favourable and the crop did well, the seed cane having been raised from the canes grown in the farm and carefully selected. The canes were therefore much more healthy, though disease was still observable in several of the local varieties. The experimental plots were divided into three classes—

In the *varietal plots*, over twenty-two varieties of local and foreign canes, including eight acclimatized Mauritius canes from the Vizianagram plantation, were grown. In spite of the inequality of the plots the yield was good; and the red Mauritius was found to be the best variety both in regard to the weight of canes per acre and the yield of jaggery.

In the *manurial plots*, the experiments were confined to the comparative trial, for purposes of manure, of local products within the reach of the ryots. The manures tried were castor cake, bone-char, lime and compost made at the farm itself, and their order of importance as tested by the yield was as follows: bone and castor, castor, lime and castor, and compost.

On the *methods plots*, selected local varieties were planted in different ways or received different cultural treatment. In 1903–1904 the varieties tested were *bonta* and *yerra*. The latter variety succeeded admirably; but by its tall growth it completely overshadowed the smaller *bonta*, which was subject to an extraordinary invasion of jackals. Of the results of the experiments conducted at this excellent farm the following deserve notice:—

(i) The number of canes planted was reduced from 25,000—the "country method"—to 15,000 to the acre with satisfactory results. Planting in lines has been found to be preferable with reference to the ease of irrigation, detection of disease and jackals, hoeing and weeding, etc.

(ii) The making of separate holes for planting the cane has been replaced by the trenching system; but it has not yet been determined how deep the trenches should be. It is noteworthy that the sets planted in the deep trenches were almost entirely free from the attacks of the moth-borer, indicating that deep planting in some way discourages the insect.

(iii) The plants usually grown as green-dressing are leguminous and suffer from insect and other pests. The question of finding a suitable green-dressing is engaging attention.

(iv) The use of cane trash as a mulch in the first instance and its burial in the fields after the canals are reopened have several advantages; but as the trash and the crushed cane-residue are used as fuel in the manufacture of jaggery, the question of finding an equally light and highly inflammable substance which can be used in the place of the trash for boiling the syrup is under investigation.

(v) An improvement was introduced in the method of weeding and hoeing by using the *tolika* backwards, instead of forwards, and replacing it by a simpler instrument for breaking the crust formed by the baking sun after each of the first few irrigations. The result is that the ground is not trodden under foot as under the country system, and the whole field presents a singularly well-forked appearance. By the use of the rake, the cost of breaking the crust has also been reduced.

(vi) The question of reducing the expenses involved in the purchase of bamboo supports and in wrapping the canes to them by twisting the older leaves, while still half-green, has been engaging attention.

(vii) Experiments are in progress with the object of learning how long ratooning can be profitably carried on. A crop of *bonta* on a plot of ground, which was reaped as plant canes in 1902–1903 and allowed to grow again, was again reaped as "first ratoons" in 1903–1904 and yielded very well. It is being tried for the third year. It is necessary, however, that the crop should be free from disease, as it is "fatal to ratoon a crop that is diseased."

(viii) An attempt was made to improve the quality of jaggery from the refiner's point of view; but the results were not encouraging. The experiments will be continued.

The plantations made by ryots with the canes of the red Mauritius variety distributed to them in 1902–1903 were found to be healthy; and during the year under report a fresh supply of canes of this variety was made to various ryots belonging to seven taluks of the Gódávari district and to a few applicants from Ganjám, Nellore, Chingleput, Pusa and Mysore.

12. *Cotton.*—Cotton being the main staple industrial crop in the Bellary and Tinnevelly districts, its cultivation was undertaken in the Bellary and Koilpatti farms, with the object of improving indigenous varieties and selecting good seed. In the former, a quantity of ordinary seed purchased in the local bazaar was sown on about $6\frac{1}{2}$ acres; but the plants were found to be of a most mixed description. The Government Botanist selected, from amongst the crop, 138 plants which he divided into twelve classes. One of these represented the ordinary *javari* cotton and another the *yerrapatti* type, and almost all the rest were found to be variations from one or other of these two types. A scheme of operations was laid down for the year, consisting in the collection of the ripe bolls from each bush separately, and in crossing between two bushes of each of the two main varieties. The seed cotton collected from uncrossed bushes of all the classes was sorted out with reference to colour and touch, and ginned. The lint obtained therefrom was examined by commercial firms dealing in cotton. Steps will be taken, with reference to the opinions furnished by them, to restrict cultivation in the current year to the best of those varieties. The seed of crossed plants has been carefully collected and will be separately sown in the ensuing season to see whether plants of greater vigour and productiveness spring up therefrom. The seed of certain exotic or extra-provincial varieties, which were grown at the farm in 1902–1903, was sown during the year; but the plants were of a mixed character and there were doubts as to their being true to type. It was therefore considered inadvisable to attempt cross-fertilization between these plants and those of the local varieties. The seed of a variety of cotton grown in Peru, which was supplied by a merchant from England, and further specimens of American cotton seeds received from the Inspector-General of Agriculture were sown partly on small plots protected by well irrigation and partly under ordinary field conditions. In the former case the yield was not good though a certain amount of seed was collected for further trial: the latter failed entirely. The lint of the Peru variety is said to be of good quality.

At the Koilpatti farm, cotton seed of 18 extra-provincial varieties raised in 1902–1903, of three varieties grown in Bellary and of the two sorts usually grown in Tinnevelly (*Uppam* and *Karanganni*) were sown in rows two feet apart, instead of broadcast, in a field consisting of 29 ten-cent plots. The plants were, however, found to be too irregular and the varieties too uncertain to allow of any useful conclusions being drawn. It was accordingly decided merely to attempt to collect pure seed of some of the varieties, about which there was no room for reasonable doubt. Some crossing was also done at Koilpatti; but the benefit of the experiment was to some extent lost owing to the coverings on the crossed bolls having been blown away. Some seed from the crossed plants has, however, been obtained and arrangements will be made to sow it as soon as circumstances allow. The American cotton seeds furnished by the Inspector-General were sown on a poor sandy soil and yielded well.

13. *Ground-nuts.*—Ground-nut was planted, at the Koilpatti farm, on about half an acre, but did not germinate properly; and later on, the crop was attacked by a

fungoid disease, the effects of which could have been combated by ample watering; but this was not practicable owing to the limited supply of water available. The yield was only 375 lb. of nuts. The disease was found to prevail in various other parts of Southern India and a note giving a brief description of the general appearance of the disease was prepared by the Government Botanist, and arrangements were made for its publication in English and in Tamil in the District Gazettes of the chief ground-nut growing districts and for its distribution among leading ryots with instructions to keep a careful watch for evidence of the disease and give immediate intimation thereof to the Revenue Officers.

14. *Indigo plant.*—The small quantity of the seed of *Indigofera arrecta* obtained from Natal was sown in the Saidapet farm on 15 cents of land. The seed almost totally failed to germinate, and the twelve plants that at first appeared subsequently died. The sowing at the Trivandrum farm was, however, more successful and 350 plants grew up. A supply of seed will be obtained from Trivandrum and a fresh experiment made at the Saidapet farm. As stated in paragraph 14 of the previous report, specimens of all the varieties of the indigo plant grown in this Presidency were obtained and examined by the Government Botanist with the result that *Indigofera racemosa* has been discovered in the specimens received from Travancore. Of the fifteen other varieties received, only four, viz., *I. tinctoria*, *sumatrana*, *suffruticosa* and *articulata* are considered by Mr. Barber to be of economic importance; arrangements have accordingly been made for the comparative cultivation of these varieties and of *racemosa* and *arrecta*, under his direct supervision, on a piece of waste land attached to the Agri-Horticultural gardens, Madras.

15. *Aloe plantation.*—A small extent at Hindupur had been planted before the beginning of the year partly with *Agave sisalana* and partly with *Agave americana* and *vivipara*. The first two varieties have done fairly but not the last. The growth continues to be slow and proposals for the future management of the farm are awaited from the Deputy Director.

16. *Sunflower.*—At the instance of the Inspector-General of Prisons, samples of oil and fibre of "The Russian Giant Sunflower" grown in the Coimbatore Jail, experimentally for commercial purposes, were forwarded to the Reporter on Economic Products, who found that the oil was good, that its acid value was equal to 2·46 per cent. calculated as Oleic acid, and that it was higher than that of many salad oils. The use of the oil of this species of sunflower for culinary purposes having once been condemned, the Reporter on Economic Products suggested the cultivation of other kinds. The attention of the Agricultural Department having meanwhile been drawn to an article published in the "Madras Mail" regarding the utility of sunflower plants as a good preventive against the fevers prevalent in the marshy and malarial tracts of tropical countries, a small quantity of seed of the Giant Russian variety was obtained from the Coimbatore Jail and sown in the Koilpatti farm. It grew well and formed fine flower heads, but had scarcely any seeds owing probably to the absence of bees in the locality for fertilizing the flowers.

17. An Industrial and Arts Exhibition was held in December 1903 and January 1904 in Madras, to which a contribution of Rs. 10,000 was sanctioned by Government, on certain conditions.

18. *Saline soils.*—The experiments conducted by Mr. Keeling, Executive Engineer, Madura, in the reclamation of saline soils under the Periyár Project did not produce useful results owing partly to excessive rainfall and partly to the other engagements of that officer and his subsequent departure to England. The experiments will be continued on a smaller scale. In view of testing the utility of the native methods of reclaiming saline lands, regarding which information was collected by the Sub-Assistant Director, he was authorised to conduct experiments on the lands of two ryots in the Coimbatore district as well as in the Bellary and Koilpatti farms. Owing to want of co-operation on the part of the ryots, of whom one died with his servant of plague, and to lack of proper supervision, the results were practically *nil*. In the Bellary farm, a small plot of alkaline land was divided into three small terraced beds with surrounding bunds with the object of letting falling rain soak through and wash out the salts, among which common salt predominated, and was treated with gypsum, margosa cake and tannery refuse. The result was that the land, which had originally

been almost wholly bare, had a fair, and in some places a good, growth of herbage. At Koilpatti, gypsum was applied to two patches of red soil of alkaline nature, which show a considerable mechanical improvement.

19. *Saltpetre.*—To test the manurial value of saltpetre as a top-dressing especially for paddy, some experiments were conducted by four ryots of the Coimbatore district with the aid of the Agricultural Department as well as at the Koilpatti farm; but little useful information was obtained, as the experiments on the ryots' lands were not conducted under proper supervision. At Koilpatti, the saltpetre was applied in solution to the entire plot allotted for paddy cultivation owing to the land being of too uncertain character to allow of comparative experiments.

20. *Pumping experiments.*—At the instance of Mr. Chatterton, the Director of Public Instruction proposed the establishment of five or six agricultural schools at carefully selected spots; but, before approving the scheme, Government considered it desirable to have pumping experiments made similar to those conducted by the Revd. Mr. A. Andrew at Melrosapuram near Chingleput. Orders were issued for starting the experiments in five localities, of which one is to be on the banks of the Hagari in the Bellary district, where the information obtained would, it was thought, be useful in connection with the Tungabhadra Project. Proposals on this subject are under consideration. The four other stations selected for the purpose are Kadayampatti (Salem district) Mánámadura (Madura district), Saidapet (Chingleput district) and Cuddalore. The Revd. Mr. Andrew's interesting report on the results of experiments conducted at Melrosapuram was received after the close of the year.

21. *Meteorology.*—As usual the rainfall registered at the rain-gauge stations was tabulated and the results published by the Meteorological Reporter to the Government of Madras. The total number of stations in the Presidency at the end of the year was 435 (inclusive of 61 in the Native States) or two more than at the end of the previous year, and of these, 345 stations were inspected.

22. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction:—(1) Season reports in 3 sections (rainfall, cultivation and prices of food-grains and salt) monthly; (2) Crop forecast reports; and (3) Quarterly reports of cattle mortality.

23. *The Madras Agri-Horticultural Society.*—The income of the Society from various sources, including the Government grant of Rs. 4,000, amounted to Rs. 17,083. The usual flower-show was held on the 28th February 1904 in the nursery gardens and was on the whole a success, the annuals being exceptionally good.

IV.—BOTANY.

24. A detailed report on the work done by the Government Botanist is appended. The chief tour undertaken in connection with the *Botanical survey* of the Presidency was in the Anamalai forests. Mr. Barber collected 380 specimens, including 100 trees and 80 ferns and shrubs, the greater portion of which was named, and a valuable collection of the peppers of these and other forests was also made. A list of the trees with their vernacular names was furnished to the Forest Department, and a small named collection of 45 trees was placed in the Coimbatore museum as a nucleus of a forest herbarium. A commencement was also made in the study of the trees of the coffee zone of the Mysore forests and a set of about 200 trees was got together; but the work of naming these trees and the collections of grasses received from Forest officers is much in arrears, the existing staff being unable to cope with much systematic work. The collection of *fungi* commenced last year was discontinued for want of space, and the *entomological* work of the year was more or less preparatory. The collections of insect pests previously made were examined and got into good order, and the families of the insects were determined, this being the only work possible in the absence of proper reference collections. Some of the information obtained on fungus disease and insect pests was published in the bulletin on the diseases of sorghum in this Presidency.

In connection with *economic botany*, the Government Botanist inspected several important crops in the Coimbatore district, took careful notes of the conditions under which they were grown and of their pests, and made large collections for the economic

herbarium. He further investigated and reported on the diseases in pepper plantations and paid a visit to the pepper gardens in Malabar and the pepper plantation at Cadamaney on the Mysore ghâts. The former were suffering from a number of diseases chiefly of fungoid and nematode origin and in the latter too, though grown on different methods, diseases appeared to be as prevalent. Mr. Barber is of opinion that pepper well merits experimental cultivation, and action in this direction is under contemplation. His other contributions to economic botany have been noticed under Section III.

V.—VETERINARY.

25. The detailed report* on the operations of the Civil Veterinary Department is appended. The Veterinary College referred to in paragraph 22 of the report for 1902–1903 was opened under the designation of "The Madras Veterinary College" in October 1903, and the hospital belonging to the Society for the Prevention of Cruelty to Animals at Vepery has been attached thereto. The course of instruction extends over three years and the curriculum of studies is based on the syllabus settled at the Umballa Conference in 1900. The students received instruction free of charge, and ten of them held scholarships sanctioned by Government. The teaching staff consisted of the Assistant Principal and a lecturer, the Superintendent being *ex-officio* Principal. The twenty students admitted in October 1903 did well at the two examinations held by the Superintendent.

26. *Veterinary dispensaries.*—As stated in the report of the previous year, the establishment of Government Veterinary dispensaries continued in abeyance for want of qualified men. The Court of Wards opened a dispensary in July 1903 in Pithápuram, the head-quarters of an estate under its management. The number of patients treated during the year was 639, of which 581 were bovine. The dispensary opened at Trichinopoly by the District Board is reported to have been very popular, the number of cases treated during the year having aggregated 7,413, of which 4,863 were cattle patients. The hospital attached to the Madras Veterinary College is growing in popularity, and the cattle practice is improving since the Superintendent offered to treat cattle patients free of charge.

27. *Cattle disease.*—The steps taken during 1902–1903 to prevent cattle disease by inoculation were continued during the year. The number inoculated against anthrax was 6,281 in the Ganjám, Gódávari, Nellore, Chingleput, Tanjore, Tinnevelly and Malabar districts and against rinderpest 2,805 in the two districts first mentioned. The Superintendent paid several visits to a few centres in these districts and found that the inoculated cattle were doing well. Preventive inoculation for cattle diseases is now well accepted by the ryots, and the only desideratum is a sufficient supply of serum and a staff of Veterinary Assistants.

28. *Pony-breeding operations.*—Of the 15 stallions at work, three were lent to private breeders in the Coimbatore, Salem and Gódávari districts, seven stood in Coimbatore, three in Salem and one in each of the Madura and Trichinopoly districts. The operations were conducted during the year on the new lines referred to in the previous report; and though it was at first apprehended that there would be a falling-off in the number of mares served, the results exceeded expectations, the total number of coverings having risen from 352 to 426 giving an average of 28 mares per stallion against 32 in the previous year. The decrease in the average is ascribed to one of the stallions having been under treatment till the end of September 1903 and to the four new stallions having commenced work only in May 1903. Of the 352 coverings in 1902–1903, the Superintendent has ascertained the results in 216 cases only. Sixty-seven cases were successful including 13 that aborted, and 149 cases were empty. The results are not traceable in 25 cases owing to the sale of the mares, and reports from Revenue officers are still due in the remaining 111 cases.

Seventy-four entire ponies in the Coimbatore district and 17 in the Salem district were castrated against 31 and 34 respectively in the previous year. There were no casualties among those castrated.

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* The Madras forms J, K, and L are blank for the year under report; and the statement of expenditure incurred in the Madras Veterinary College from October 1903 to March 1904 which is printed at the end of the Superintendent's report has not been submitted in the Madras form O.

29. *Pony shows and cattle fairs.*—No pony shows were held during the year. The Madras Cattle Disease Act (II of 1866) was put in force at most of the fairs held in the Tinnevelly district and in seven of these, Veterinary Assistants helped the local authorities in carrying out the provisions of the Act. In none of the fairs were any cases of contagious disease detected. A cattle show was held at Kasimkota in the Vizagapatam district.

VI.—AGRICULTURAL EDUCATION.

30. The minors under the Court of Wards at Newington continued to receive instruction in Agriculture and Botany as stated in previous reports.

31. *Higher education.*—The College of Agriculture continued to work under the revised curriculum introduced on the recommendation of the Special Committee; but the number of students on its rolls fell from 50 to 46 owing to the discontinuance of the practice of admitting casual students for particular subjects. As Dr. Leather's services could not be spared from Dehra Dun and an Agricultural Chemist was not appointed for this Presidency, the special course of lectures in Agricultural Chemistry was delivered by the Principal of the College. Since the establishment of the Madras Veterinary College in October 1903, the lectures of the Superintendent, Civil Veterinary Department, who was otherwise fully engaged, ceased at the Agricultural College. Further, after the departure of Mr. Thorne, Vice-Principal, there was no practical European agriculturist who could teach agriculture. The Acting Vice-Principal and the Assistant in charge of the Veterinary Hospital to some extent supplied these shortcomings. The results of the final examinations were below the average owing probably to the quality of the candidates.

The Veterinary Hospital attached to the college continued to increase in popularity, the total number of cases treated having risen from 1152 to 1218.

The students of the College made two tours of agricultural enquiries, the first in September in the Chingleput district, which included a visit to the Revd. Mr. Andrew's farm at Melrosapuram, and the second in January in the Cuddapah and Kurnool districts. The Director inspected the College farm in December 1903 in company with Mr. Mollison, Dr. Bourne and Mr. Benson and the general impression conveyed was most unfavourable even after making every allowance for the severe damage caused by the heavy rains and floods of December 1903.

VII.—THE PUBLICATION OF AGRICULTURAL INFORMATION.

32. The note on simple machines for extracting plantain fibre, referred to in paragraph 30 of the previous report, has been translated into the vernaculars with suitable modifications and additions for the information of ryots, and instructions are being issued for the printing of a sufficient number of copies for circulation with the District Gazettes. The following bulletins were published by the Department during the year under report:—(1) *No.* 48.—Note on the experimental sugarcane station at Samalkot, Gódávari district; and (2) *No.* 49. Diseases of Andropogon Sorghum in the Madras Presidency.

33. Arrangements were made to translate bulletin No. 48 into Telugu and Tamil and publish it in diglott as a supplement to the District Gazettes for the benefit of ryots. An Assistant in the office of the Government Botanist also toured round the cane planting villages in the Gódávari district, and explained to the ryots the improved method of sugarcane cultivation followed in the Samalkot farm.

34. The Industrial Monograph on "Wood Carving" prescribed for 1901–1902 was issued during the year, and that on "Tanning and Working in Leather" due for 1902–1903 was submitted to Government after the close of the year. No industrial monograph is due from this Presidency for 1903–1904.

35. The number of papers received from and communicated to other Provincial departments was as follows:—

	Received.		Sent.
	Indian.	Foreign.	
	NO.	NO.	NO.
Total publications	361	660	21

APPENDIX I.

Annual Report of the Government Botanist, Madras.

I have the honour to present the following report of work done in my office during the year 1903–1904.

2. There has been a very great increase in the number of subjects dealt with, especially in connection with Economic Botany, and it has been found impossible to refer to all individually in the space assigned for this report. The working room at our disposal has remained unchanged. This has proved so inadequate that active collecting has been largely in abeyance, and the time of the staff has been devoted to the attempt to keep the existing collections in a proper condition. In spite of all our efforts, a number of specimens have been destroyed by dust and damp, by rats and insects. The actual investigating work has been conducted under the greatest disadvantages as regards light and space, and many matters which would otherwise have occupied our attention have been perforce left over until a more suitable accommodation is provided.

3. The Government Botanist spent 230 days on tour and 136 at head office. The Anamalais, the Wynaad, Malabar, the Mysore ghats, the Mysore sandalwood tract, Dharwar, the Bombay Agricultural farms, Coimbatore, Bellary and various parts of the Gódávari district have been visited for longer or shorter periods, and the Assistants have now commenced to take their part in this important work. They have been sent to Ootacamund, Bellary, the Gódávari district, North Arcot, South Arcot, Erode and Chingleput on independent missions.

4. Collections have been made of forest trees, grasses, peppers, indigos, and the most various economic plants, while a very large number of seeds have been sent to the Reporter on Economic Products to the Government of India. Collections of special groups have been sent to authorities at home for naming, an active correspondence has been kept up with those interested in agriculture in the Presidency and numerous reports have been prepared for the Director of Agriculture.

5. The following are among the more important pieces of work undertaken during the year :—

In connection with the systematic part of the survey, the Anamalai forests were visited by the Government Botanist and an Assistant from April 7th to May 25th. This was at the instigation of the Forest department who wished to know what the botanical names were of their forest trees. Three hundred and eighty numbers were collected consisting of 180 different plants. Of the 100 trees, 70 have been named and 30 are not at present determined. The 80 ferns and shrubs have mostly been named. A valuable collection of the peppers of these and other forests has been made, including dried and spirit specimens. A list of the trees with their vernacular names (about 200 of which have been collected from the Kaders) has been sent to the Conservator of Forests in the Southern Circle and a small named collection of 45 trees has been placed in the Coimbatore Museum as a nucleus of a forest herbarium.

This was the main systematic work of the year, but smaller collections were made at such places as the Government Botanist visited.

6. An Assistant was also sent to make a study of the trees of the coffee zone of the Mysore forests. His first tour, which was more or less preparatory, was in December. Most of the trees were found to be without flowers or fruits, but a set of about 200 were got together, of which 109 have now been named. This tour, which was made with the idea of ultimately helping the planters in their study of suitable shade trees and the causes of stump-rot in coffee, was undertaken with the assistance of Mr. Graham Anderson, C.I.E., to whom we are indebted for many facts concerning the vernacular names and uses of the different trees collected. The work is still being carried on as opportunity permits with the help of Mr. Anderson.

7. Collections have been received as usual from District Forest-officers, two lots of grasses (37 species) from North Salem, one lot of grasses (34 species, of which 19 are unfortunately indeterminable) from Nellore, and one small lot of 12 species from Cuddapah. While welcoming these collections, we are considerably behindhand in naming them, as well as those sent in previous years. Four collections have been named during the year, but none of those referred to have been completed. Our present staff is unable to cope with much systematic work.

8. Many individual plants have been received for naming. A set of *Eucalyptus* specimens has been collected at our request by the Curator of the Ootacamund Gardens and forwarded to the Government Botanist at Sydney, as he is monographing the group.

9. Our collection of 76 sheets of yams has been sent to Dr. Prain at the Calcutta gardens, and he has very kindly named them for us. Our whole collection of ebonies, with the Government Botanist's drawings, has also been sent to Dr. Prain, as he has made a special study of the group and these seem to be new species among those collected. A large number of sheets of indigos have also been sent to Dr. Prain who has named these difficult plants for us. A full set of our balsams, together with the paintings of Mr. Lawson's artist, has been sent to Sir Joseph Hooker who is now engaged in monographing the balsams of India. He has been pleased to speak well of their general get-up, and it is perhaps admissible to quote his words of appreciation, as they will show more than anything else that this work of systematic botany, although taking a subordinate place at present, is not being neglected altogether.

"The collection is in splendid order, well collected, well mounted, and well arranged. It is by far the finest collection of Indian balsams that I have seen and will afford me great help in many ways." Our small collection, finally, of *Pandanaceæ* has been sent to Professor U. Martelli, in Italy, who is monographing the genus.

It may be explained that this sending of sheets from our collection to various correspondents is not at all an unusual thing. Also, that before doing so the collections are worked out to the best of our ability in the office. By this method we obtain a number of valuable and authoritative namings which from our position we are quite unable to give, and, furthermore, the collections are greatly enriched by the annotations of monographers who are for the time being the greatest authorities on their respective orders.

10. The herbarium work has been conducted under the disadvantages already alluded to. About 2,000 sheets have been mounted for the systematic survey, 700 of which were from the Gódávari gorges and about 1,200 from the Anamalais. A large number (604 sheets) of plants have been prepared for transmission to Calcutta, but the congested state of our office has prevented them from being forwarded. In exchange, a considerable number of sheets (289) have been received from Dr. Prain for incorporation in our herbarium.

11. The collection of fungi, commencedlast year at the instigation of Dr. Butler, has been discontinued for lack of space. All our sorghum smuts have, however, been sent to him for naming. Added to them was a large collection of grasses with smuts on them. These have a certain economic importance in that they affect the feeding value of pastures considerably.

Among the most interesting fungi sent to Dr. Butler was the red spot disease found so abundantly on sorghum leaves. This appeared at first sight to be identical with the red smut of sugarcane, *Colletotrichum falcatum*. But Dr. Butler has determined it to be the closely allied *Colletotrichum lineola*. Various fungus diseases of sugarcane, prickly-pear, sorghum, etc., were also forwarded while many fungus diseases of sorghum, tenai, cumbu, paddy and other crops were collected. A certain amount of this work was collated in the bulletin on the diseases of sorghum in the Madras Presidency. A considerable amount of time was spent over the fungus diseases of the pepper plantations and a report was written on the subject. Casuarina trees, dying in numbers on the east coast, were also examined, but, after long search in the specimens forwarded, no fungus hyphæ were observed which appeared likely to cause the diseased condition of the trees. In the short tour to Yelwal with Dr. Butler some attention was paid to the spike disease in sandal which has much the character of a fungoid attack. Generally speaking, however, this part of our work, the study of cryptogamic botany, has been neglected. There is no one at present in the office who can be entrusted with the difficult microscopic examination needed, and the time of the Government Botanist has been taken up with other matters.

12. The study of fungi is closely connected with that of insect pests. The entomological work of the year has been of a desultory and more or less preparatory character. Owing to pressure in the office, the Sub-Assistant appointed for this work has been frequently employed in other ways. The previous collections have been gone over and got into good order. By the advice of Mr. Lefroy and in the absence of proper reference collections we have contented ourselves largely with determining the families of the insects collected. This method has been a useful education for the Sub-Assistant and has undoubtedly strengthened our hands in enabling us to deal more rapidly with such entomological work as is placed before us.

A couple of brightly coloured moths, which are accustomed to attack the sunn hemp fields in the Gódávari district disastrously, were worked out and, on reference to the Indian Museum, were named *Deiopia pulchella and Argina cribraria*. Some attention was devoted to the *Aleurodes* common in the diseased cane fields, but it was thought that this pest was secondary in its nature and only appeared on weakly plants. It has been used as an outward sign of the presence of red smut in the cane stem. The study of the Nilgiri white grub was continued, but comparatively few additions were made to our knowledge of this serious pest. The work on this subject will, it is hoped, be shortly presented for publication in the form of a bulletin. A ready method has been discovered of freeing individual gardens from these depredations. Many references of a minor character have been received and dealt with, but as a rule the details forwarded have been too meagre and the specimens immature. It is felt that the present arrangement of having one sub-assistant is hardly sufficient for dealing with this difficult subject. A certain amount of work on insect pests was included in the bulletin published on the Diseases of sorghum in the Madras Presidency, but the Government Botanist has not been able to devote such attention to the subject as it merits.

13. The subject in Economic Botany which has engaged the attention of the office most has been the management and study of the experiments on the Samalkota Sugarcane farm. Ten visits were paid to the farm by the Government Botanist during the year. The longest of these was for twelve days in June after the opening of the canals, but, during the months of February and March, the attention of the office as a whole was almost entirely devoted to sugarcane matters, including the reaping of the crop and the planting for the new season. A number of canes were distributed to the ryots for experimental cultivation. A careful study, with the co-operation of the Chemist of the Deccan Factory, was made as to the possible improvement of the local jaggery. The Samalkota canal was surveyed with the idea of finding a suitable place for a combined sugarcane and paddy station, but the result was not satisfactory. A number of canes were brought down to Madras and exhibited at the annual show of the Agri-Horticultural

Society. A visit was paid to the Vizianagram plantations of five years' acclimatised Mauritius canes, and a considerable number of plants were added to the Samalkota collection through the kindness of the Collector. In return for this generous treatment a scheme was prepared for the future sugarcane experiments at Vizianagram and the crop was taken off and the jaggery prepared by the Agricultural Inspector attached to the Samalkota farm. A number of canes were received from the Inspector-General of Agriculture, representing the two best Bengal varieties, and local kinds were collected from South Arcot, Madras and North Arcot for detailed study at the farm. The collection of different varieties of cane under observation at Samalkot now numbers about thirty. A series of reports on the results obtained has been submitted to the Board so that further details are unnecessary here.

In connection with this subject it may be stated that the sugarcane cultivation was carefully studied in the Coimbatore district (where a serious attack of a sereh-like disease was noted), in North and South Arcot.

14. At the instance of the South Wynaad Planters' Association, the subject of pepper diseases was taken up with some amount of care. Since the diseases appeared to be chiefly of fungoid nature, it was not possible to do much, but a couple of reports were written and printed by the association. South India being the original home of the pepper of commerce, and the classification of these puzzling plants being, according to Sir Joseph Hooker, in a state of almost hopeless confusion, the wild peppers were investigated and a good collection was made for future study. A visit was paid to the pepper gardens in Malabar (May 26th—June 11th). These were found also to be suffering from a number of diseases chiefly of fungoid and nematode origin. On the whole it was considered that the pepper plantations of the Presidency were not in a healthy condition and well merited experimental cultivation. A visit was paid to the Cadamaney pepper plantations on the Mysore ghâts, but, although the mode of growing the plants was in many respects diametrically opposed to that in Tellicherry and the Wynaad, the disease appeared to be as prevalent and evasive as ever. The plantations at Cadamaney are very largely natural, that is to say self-sown in the jungle. The constant presence of a definite fungus on the dying branches led to a series of inoculation experiments being commenced. But the results thus far seem to indicate that this fungus (*a Nectria* ?) is saprophytic and not the cause of the disease. The disease at Cadamaney was stated by the Kew authorities to be caused by a root fungus called *Rosellinia necatrix Prill., and Del.*, but a careful search on the spot failed to reveal its presence. A projected visit to the Bombay ghâts was frustrated by the lack of information placed at our disposal. From all accounts the pepper there seems to be in a more flourishing condition than elsewhere in India, and for this reason the plantations would be worth a visit later on.

15. The main agricultural tour set apart for the economic survey of the Presidency was in the Coimbatore district (July 9th—August 11th). The line chosen was Coimbatore, Udumalpet, Madaturkolam and Dharapuram. The crops inspected were cholam, cotton, tenai, ragi, cumbu, betel, pepper, cummin, coriander, fenugreek, sugarcane, gingelly, varagu, brinjals and several minor ones. Careful notes were taken on these crops and their pests, together with the water supply and mode of irrigation and the character of the soil and climate. Large collections were added to the economic herbarium and many specimens were placed in spirit for future investigation. The bazaar at Udumalpet was visited and numerous samples of different agricultural produce were taken.

16. During the month of September advantage was taken of a tour in South India by the Cryptogamic Botanist and Entomologist to the Government of India to discuss matters connected with future joint work. The first place visited was the Samalkota farm where the various experiments were explained and specimens of pests were collected. The Madras office was then carefully gone over and a number of specimens in our collections were noted and some of them named for us. The Entomologist kindly drafted a set of instructions for the guidance of the Entomological Sub-Assistant. The Mysore State was then visited. The planters took advantage of our presence to hold a general meeting at Saklaspur. The Cadamaney pepper plantations were then visited by me and I again joined Drs. Butler and Lehmann at Yelwal for the investigation of the spike disease in sandalwood. The study of this disease having been placed definitely in the hands of Dr. Butler by the Government of India, I assumed a merely helpful attitude. Incidentally I learnt during this visit that the same disease had appeared within a few miles of the sandal-bearing tract of Kollegal in the Madras Presidency. This I at once reported to the Board and subsequently learnt from the District Forest-officer of North Coimbatore that spike had made its appearance in Kollegal at some distance from the Mysore boundary. I have placed the authorities in communication with Dr. Butler who is conducting the investigation.

The futile attempt to reach the pepper plantations of the Bombay ghauts belongs to the same tour and has already been referred to. I turned my attention to the crops in Dharwar and made collections and notes. The betel gardens of the little native state of Savanur were carefully gone over with Dr. Butler and a number of pests in this usually healthy crop were noted and collected.

17. In the earlier half of November I accompanied the Deputy Director on a tour of inspection through the Bombay farms. This was at the instance of the Inspector-General of Agriculture, who had assembled agricultural officials from various parts of India. As already reported in detail, we visited Poona, Bombay, Surat, Ahmedabad, Chharodi, Nadiad, noted

the experiments of Professor Gammie in cotton crossing, and observed the sugarcane, ground-nut, tobacco and sorghums plots. Some observations made during this tour were incorporated in a recent report to the Board.

18. The Bellary farm was visited twice during the year in company with the Deputy Director of Agriculture, in connection with a scheme I had drawn up for cotton crossing in the Madras Presidency. The plants were examined and numbered, herbarium specimens were collected, and the lint collected was sorted. A more detailed scheme for crossing was prepared for the plants growing at the Saidapet farm, but the weather proved most inauspicious and the floods of December nearly washed the whole place away. Separate reports have been prepared on these places, in connection with the improvement of Indian cottons.

19. These were the main agricultural tours conducted by the Government Botanist during the year. An assistant was deputed to Ootacamund to study the swarming of the cockchafers in April and May, and again in September to examine the results of sowing some of the chief forms in boxes with grass on them. He was however new to the work and little success attended his efforts. Reference has been made to the tour in the Mysore coffee zone by another Assistant to collect the shola trees. An Assistant was deputed to Bellary to collect heads of the different kinds of cholam growing at the Experimental Farm. An Assistant was deputed to South Arcot and at the same time another to North Arcot to study the sugarcane growth in these two districts, and by this means our knowledge has been largely increased in both these directions. An Assistant was sent with good results among the Gódávari ryots to familiarise them with the methods of cultivation adopted in the Samalkot farm and to show them the kinds of cane we were distributing. Another Assistant was deputed to collect seed of Bourbon naturalised cotton in the Erode taluk for the Inspector-General of Agriculture. The Agricultural Inspector in charge of the Samalkot farm made several tours in the Gódávari district and visited the Vizianagram plantation to make preparations for milling their canes for them there. Besides these tours among the assistants, one accompanied me on the Anamalai tour, another went with me to Tellicherry, and a third accompained me throughout the Coimbatore Economic tour.

This is the first year in which systematic touring has been done by Assistants, and the results have been eminently satisfactory in a general increase of their usefulness.

20. About 1,000 sheets of economic plants have been added to the herbarium. These are made up as follows:—257 sheets of cholams, 93 of cumbu, tenai, etc., 66 sheets of sorghum diseases, 292 sheets of cottons and over 200 of various others. Besides these a large number have been added to the spirit collections, all of which are in a fit state to be examined under the microscope when a suitable opportunity occurs.

21. A number of seeds of different kinds of crops have passed through the office, during the year under review, to the Reporter on Economic Products to the Government of India. This work, which has largely occupied the clerical section, included 136 lots of paddy, 51 of cholam, 15 of chillies, 11 of ragi, 17 of cumbu and tenai, and others in smaller quantity, such as gingelly, cow-gram and varagu. A sample of each has been retained in the office, the economic collections being thereby considerably strengthened.

22. Twenty-three parcels of indigos were received from different parts of the Presidency. As recently reported, these include 17 kinds of wild and cultivated forms, and although therefore connected with the systematic survey, several species of high economic value have been recorded. Thus the wished-for *Indigofera longeracemosa* has been rediscovered in Travancore—a plant which has the reputation, rightly or wrongly, of being the most valuable indigo-producing plant in the world, and now cultivated in Madagascar and Zanzibar. *Indigofera sumatrana* appears to be the main cultivated form in the Madras Presidency, but *I. tinctoria*, *I. Anil and I. articulata* have been met with wild in different parts, and it seems not improbable that they may be escapes from former cultivation. We have in this study been much indebted to Major Prain, without whose help the work could not have been done.

23. The artist has worked steadily throughout the year and has added a fine series of drawings and paintings to the herbarium. He was deputed for one month to study the methods of the artist working under Mr. Cameron at Bangalore, and his work has profited much thereby. We are indebted to Mr. Cameron for his kind personal superintendence in this matter. The artist's work consists of 38 paintings, chiefly of flowers and varieties of sugarcane, and 53 folio pages of drawings, the latter being reproductions of sketches on tour by the Government Botanist, and chiefly consisting of analyses of various forest trees.

24. The following publications have been issued during the year:—

(1) A Memorandum on the Pressing, Preservation and Despatch of specimens to the office of the Government Botanist.

(2) A Note on the Experimental Sugarcane Cultivation at Samalkota. This was issued as Bulletin No. 48 of Vol II of the Madras Department of Agriculture.

(3) The diseases of Andropogon Sorghum in the Madras Presidency, Bulletin No. 49, in the same series.

(4) Two reports on the Wynaad Pepper plantations have been printed and circulated by the South Wynaad Planters' Association.

(5) *Notes on Floras have been prepared for various publications.*—The Madras Presidency the South Arcot District, the Gódávari District.

MADRAS,
25*th May* 1904.

(Signed) C. A. BARBER,
Govt. Botanist.

APPENDIX II.

Annual Report of the Superintendent, Civil Veterinary Department, Madras.

I have the honour to submit my report on the working of the Civil Veterinary Department during the year 1903-1904.

2. I was in charge of the department throughout the year. A greater portion of my attention was devoted to the organization of the Veterinary College. During the year I was in camp for 136 days and the remaining period was spent at head-quarters except five days in June when I was on casual leave. The period on tour was spent in visiting a few taluks of Gódávari and Ganjám districts and also Sáttúr taluk of the Tinnevelly district where inoculation was carried out and in inspecting all the pony-breeding stations in the Coimbatore and Salem districts. I paid several visits to Madura district in connection with the pony-breeding operations and also in reference to the proposal of the District Board for opening a Veterinary dispensary. The Veterinary dispensaries in Pithápuram, Trichinopoly, and Saidapet were also frequently visited by me during the year. In the districts I visited, it has been my endeavour to find out what prospects existed for cattle-breeding and for Veterinary dispensaries at important centres. Occasion was also taken to inspect one of the cattle fairs in the Tinnevelly district, and at the Board's request I went to Chatrapur to inspect an elephant of the Agency of the Ganjám district.

Appendix Form A.

3. *Pony-breeding operations.*—At the commencement of the year there were 15 stallions at work, 9 in Coimbatore, 5 in Salem and 1 in Madura district. The number at stud during the preceding year was only 12. Three stallions were stationed with private breeders. Two of them retained possession of the Government stallions during the whole year, but one of them Mr. Morgan of the Carrada estate retained only for two months. During the latter part of the year a stallion was lent to the Raja of Tuni but he does not seem to have properly utilised its services. There is a requisition from Mr. Arbuthnot, the District Board Engineer, Vizagapatam, for the loan of a Government stallion and also from the zamindar of Ettiyapuram. I paid two visits to Salem and Coimbatore districts and visited all the pony-breeding centres. But stations such as Kangayam, Dindigul, Palayakottai and Pagalpatti were inspected more often. The total number of coverings effected by all the Government stallions during the year under report was 426 and exceeded that of the previous year by 74. This gives an average of 28 per stallion as against 32 during last year. The four new stallions commenced work only in May 1903, and stallion "Baby" which was under treatment at Madras commenced to work only in October 1903.

Appendix Form C.

(i) *Coimbatore.*—Except stallions Abdullah, Nile, Ophir and Punch which were standing at their respective centres during the whole year, the other stallions in Coimbatore district had to be transferred from one centre to another in search of work. Stallion Selim was working at Erode until 10th September 1903, when he was transferred to Hosúr in the Salem district and was replaced by stallion No. 23 Jumna from the latter station. "Parel" was working at Palladam in the Coimbatore district until 18th February 1904 when he was transferred to Tuni station in the Gódávari district. "Hector" was working at Pollachi until 26th November 1903, when he was transferred to Gopichettipalayam. The total number of coverings in Coimbatore district alone was 271 for 10 stallions or an average of 27 per stallion. It seemed to me unnecessary to rest the stallions as in former years, as they are really underworked. The work turned out may be considered short owing to the fact, that they worked for 12 months instead of 10. But the new stallions commenced work only in May and some time was lost in transit as some of the stallions were constantly transferred from one centre to another. A stallion used to be stationed at Kollegal permanently, and it was a good centre for pony-breeding operations, but owing to the prevalence of plague he had to be withdrawn. The work in Palladam and in Dhárápuram taluks was not good. But Palladam is not a very good centre for pony-breeding operations and Dhárápuram is also the same owing to its nearness to Kangayam where three stallions are at work. Besides, Dhárápuram was declared an infected area during the latter part of the year. During the year the experiment was tried of making it purely optional for pony owners to bring in their mares to Government stallions and no peons were allowed to collect mares as in past years. It was anticipated that in consequence at first there would be a falling off in the number of mares served, but the opposite has resulted as the number of coverings has exceeded last year by 74.

(ii) *Salem.*—The total number of coverings in this district was 113 for 5 stallions or an average of 22·6 per stallion. The work was very poor. This is due to prevalence of plague in Hosúr which is otherwise a very important centre for pony-breeding operations. Stallions

" Tigris " and " Carbon " remained permanently during the year under report at Hosûr and Pagalpatti respectively. " Sunshine " remained for four months at Harur, five months at Dharmapuri and three months at Pennagaram. " Rahiman " was working between Pennagaram and Dharmapuri until 5th August 1903, when he was transferred to Trichinopoly. " Jumna " was transferred to Erode in place of " Selim " which arrived at Hosur on the 16th September 1903. It is interesting to note that mares were received at Hosur for service from Mysore Province, Ráyachóti taluk of the Cuddapah district and Palmaner in North Arcot and locally from Salem, Uttankarai and Krishnagiri taluks.

(iii) I consider that stallion " Rahiman " at Trichinopoly and " Samawy " in Madura district are doing good work. A stallion was sent for the first time to Trichinopoly but Madura is a centre where pony-breeding operations were in existence formerly. In Trichinopoly the work of the stallion is also supervised by the Veterinary Assistant in charge of the Veterinary Dispensary.

Bellary is still declared to be an infected area and therefore I have not made any arrangements to extend pony-breeding operations to this place, though it was believed that there is wide scope for the industry. It is hoped that something may be done at least during the ensuing year 1904–1905. I also visited Nilgiris and Kottagiri during the year. The former to interview Mr. A. Morgan on the prospects of pony-breeding and the latter to inspect the mule-breeding farm managed by Mr. Edmiston.

The subjoined statement will show where the Government stallions were located and the work done by each :—

Number.	Name of stallion.	Number of coverings.	Place where worked.
	Coimbatore district.		
6	Abdullah	30	Kangayam.
11	Parel	19	Palladam, until 18th February 1904, transferred to Tuni.
15	Selim	10	Erode, until 10th September 1903, afterwards transferred to Hosur.
17	Hector	33	Pollachi, until 26th November 1903, transferred afterwards to Gopichettipalayam.
18	Baby	33	Kangayam, arrived from Madras 27th September 1903, transferred afterwards to Aravakurichi.
19	Nile	16	Dhárápuram.
22	Ophir	32	Palayakottai.
23	Jumna	18	Erode, transferred from Hosur.
24	Ali	41	Kangayam, Aravakurichi and Karur.
26	Punch	39	Kangayam.
	Total ..	271	
	Salem district.		
13	Sunshine	30	Harur, Dharmapuri and Pennagaram.
20	Tigris	29	Hosur.
23	Jumna	12	Hosur, transferred to Erode.
25	Rahiman	14	Dharmapuri and Pennagarm (14).
15	Selim	8	Hosur.
7	Carbon	20	Pagalpatti (Salem district).
	Total ..	113	
27	Samawy	24	Dindigul and Palni in the Madura district.
25	Rahiman	17	Trichinopoly.
11	Parel	1	Tuni in the Gódávari district.
	Grand Total ..	426	

4. *Results of coverings of the pony-breeding operations.*—During the previous year (1902-1903) 352 mares were covered. The results of coverings were ascertained in 241 cases only and in the remaining 111 cases the reports of the revenue officials are still due. Of the cases that were ascertained 149 were reported empty, 25 were sold and not traceable and the remaining 67 were successful coverings including 13 mares that had aborted. This would give a percentage of 27·8 of the successful coverings as against 23 8 of the previous year. There is no doubt that a large percentage of the coverings have proved successful; but it is very difficult to extract information from the ryots who misunderstand our enquiries. Revenue officials are now entrusted with the work of ascertaining these results and the Veterinary Assistant has been withdrawn for the more important work of cattle-disease. There is no opportunity for this department to verify these reports, at least in a few cases, and it is also not possible to make the villagers themselves report the results in each case. Appendix Form C.

(ii) *Mule-breeding operations.*—The total number of coverings during the previous year was 113. The results were ascertained in only 50 cases. For the remaining the reports are still due. Of those cases that were ascertained, 35 coverings were successful and this includes 16 mares that aborted. Mule-breeding has now been discontinued.

Appendix Form D. The cost of the operations amounted to Rs. 4,718–0–2 including Rs. 87–8–7 incurred in connection with the mule-breeding.

Appendix Form E. 5. *Castration.*—In Coimbatore district there were 2 salustries and 74 entires were castrated by them. The number of castrations during last year was 31 and the work of the year under report may therefore be taken as indicating some progress. In Salem district only one man was at work and he castrated only 17 entires. This is very poor work and there is no excuse why more entires were not castrated unless the prevalence of plague stood in the way of castration also. Hosùr is the only centre where more work can be done under castration, but this place has unfortunately been deserted in many places on account of plague. Senior Veterinary Assistants had also castrated a few cases on their tours and there were no casualties either in those cases attended by them or the salustries.

Appendix Forms F & G. 6. *Cattle disease.*—A statement showing the total loss of cattle in each district during the official year 1903–1904 and the statement comparing the loss during the year with that of the four previous years are appended herewith.

Appendix Form F. The total loss during the year was 93,158, which is slightly over the figures of the two previous years, but it is very doubtful if any reliance can be placed on the accuracy of the report. In the years 1899–1900 and 1900–1901 the loss was 34,062 and 27,378 respectively under rinderpest and diarrhœa and dysentery put together, but in the year under report and the two preceding years the loss was about 18,000. This sudden decrease in the cattle deaths though satisfactory, cannot be regarded as representing the correct figures. From unspecified diseases alone 32,548 deaths were reported and it is possible that many of these deaths were due either to rinderpest or anthrax. There was an unusually large number of deaths from black-quarter and malignant sore throat and the death-rate is more than double the average of the four previous years. There is nothing special to note under epizootic aphtha, except the large number of deaths among young calves in the Chingleput district. It may be observed that the average loss during the last five years from cattle diseases alone was 94,040.

Appendix Form G. From the statistics it may be readily seen that casualties among cattle are exceptionally heavy in the districts of Ganjám, Gódávari, Kistna, Nellore, South Arcot, Tanjore and Chingleput. In Ganjám and Gódávari it is especially severe. The total live-stock in Ganjám is about four lakhs and in Gódávari about nine lakhs. In these two districts the death-rate is nearly 20,000 or a fifth of the total loss in the whole Presidency. I have had occasion to explain in my previous report that the nine lakhs of cattle do not really represent the number of cattle as large herds from surrounding districts are brought into Gódávari for grazing, and this no doubt is answerable for the introduction of disease and the large losses entailed. One Senior Veterinary Assistant is in charge of these two districts, where employment could be found for not less than half a dozen. A considerable number of cattle were inoculated in these districts and it has been ascertained that the results were very satisfactory. I made several visits to a few centres in these districts and I found that the inoculated cattle were doing well and the ryots generally appreciate the treatment. Preventive inoculation for cattle diseases is well accepted in this Presidency and all that is now necessary is a sufficient supply of sera. It is essential that at least one or two Veterinary Assistants should be in charge of each of the abovenamed seven districts and much useful work would be done by starting a number of Veterinary dispensaries in different centres of these districts. The success that has attended the Veterinary hospitals at Trichinopoly and Pithápuram augurs well for the future of similar institutions. The work done in these two hospitals is explained elsewhere. The total loss from anthrax was 16,887. This disease was most virulent in Gódávari, Nellore and Tanjore districts and nearly one-half of the total loss was contributed by these three districts. Veterinary Assistants were from time to time engaged in these districts, but the number of cattle inoculated by them for anthrax was small owing to the difficulty of procuring anthrax serum in sufficiently large quantities. Eventually I think it will be found to be more convenient to establish laboratories for manufacturing serum in the different provinces. Large doses of serum are required in order to treat cattle actually suffering from disease, and I venture to express the opinion that it may be found to be very difficult to procure the necessary sera if the manufacture is confined to one place alone for the requirements of the whole of India.

A good many sick cattle were treated with 50 and 60 C.C. of serum and the results were very satisfactory.

In addition to the loss from diseases there were 13,235 deaths from other causes. This includes 71 cases from criminal poisoning, but a great many of these cases were altered according to subsequent reports.

In dealing with cattle disease I would lay special stress on the necessity of preserving the cattle-sheds scrupulously clean.

7. *Cattle-breeding.*—In order to supplement my information in cattle-breeding, I visited during the year Ongole and Malabar districts. Ongole and its surrounding places form an important centre for cattle-breeding in the Nellore district. In Malabar there is not much to be noticed in the way of a special breed, but I think there is room for improvement. After ascertaining that the agricultural classes in the Madras Presidency were still in favour of cattle shows, I submitted a request to Government of India for an annual grant of Rs. 1,000 for prizes at the shows and have suggested to Government of Madras, the reasonableness of reviving cattle shows in the Nellore district and also of stimulating the efforts of the local people at Vizagapatam to inaugurate cattle shows in different places of the district similar to the one held at Kasimkota under the patronage of the zamindar of that place. A scale of awards and other particulars in connection with the holding of these shows were drawn up and submitted to Board—*vide* this office No. 310, dated 5th May 1904. The Collectors of the Vizagapatam and Nellore districts are in favour of these shows and in time to come these shows will indirectly help the efforts of this department in improving the local breeds. The Zamindar of Ettiapuram has realized the necessity for improving the breed of cattle and has requested this department to select for him a Nellore and a Amritamahal bull, and this matter is receiving the particular attention of this department. It is expected that several zamindars and the estates under Court of Wards will become similarly interested and consult this department in matters regarding the improvement of their cattle and sundry other things respecting them.

8. *Cattle fairs.*—The Madras Act II of 1866 was in force as usual at most of the cattle fairs held in Tinnevelly district. A Veterinary Assistant was always deputed to attend these fairs wherever it was possible to spare one. Their experience of these cattle fairs and of the arrangements thereof should, I presume, be of valuable help to the taluk officials in putting things in order. In none of these fairs were any cases of contagious disease detected. The fair grounds were generally kept clean and Veterinary Assistants were required to pay particular attention to the sanitation. No cattle fairs either in Madura or Coimbatore districts were held during the year. In all, the Veterinary Assistants attended seven cattle fairs during the year, and the total number of cattle brought for sale was about 106,915 of which 58,500 were reported to have been sold for reasonable prices. Prices ruled high except at Kazhugumalai.

9. *Veterinary hospitals.*—I am glad to bring to notice that another Veterinary hospital was organised at Pithápuram, Gódávari district, during the year. There are now on the whole four Veterinary Hospitals in the Madras Presidency including the one attached to the Madras Veterinary College, one at Saidapet and the fourth at Trichinopoly. I only receive the annual return from the Saidapet Veterinary hospital and I am at present unable to quote the number of cases treated at this place. The Veterinary hospital at Trichinopoly has been now in existence for over a year and from the returns that are received from the Veterinary Assistant through the President of the District Board, Trichinopoly, I gather that since April 1903 to March 1904, 7,413 cases were treated. Of these 682 were in-patients and 6,731 were out-patients. The details are as follows :—

	In-patient.	Out-patients.
Horse	180	1,550
Cattle	374	4,489
Dogs	128	692

It is very encouraging to find that within so short a time it should have gained such popularity, as is evinced by the fact that a large number of patients especially cattle were brought there for treatment. The Veterinary hospital at Pithápuram commenced its operations in the middle of July 1903. It is located in the place where the weekly cattle fair is held and this was selected with a view to afford it a greater publicity. A small room is erected as a pharmacy and a few sheds for patients admitted into the hospital. The hospital is provided with the necessary instruments and medicines. A graduate of the Lahore Veterinary College is in charge of this Hospital assisted by a compounder and a few servants. It is a great drawback that the Veterinary Assistant is not conversant with the local vernacular. This is one of the great objections to employing qualified men from the other parts of India. Moreover such men are not likely to gain the same amount of confidence as Madras men who are acquainted with local customs. At Pittapuram 639 patients were treated during the year and of these 581 or more than five-sixths were bovine patients. In Pithápuram the Veterinary Assistant was also employed in inoculating cattle within his jurisdiction. During the year I paid three visits to the Veterinary hospital at Trichinopoly and two to that at Pithápuram. The work at the Madras Veterinary College hospital has been reviewed separately.

(ii) Government has sanctioned the establishment of a Veterinary hospital at Madura. I visited the place in order to select a site for the necessary buildings and to suggest other particulars regarding its organization. It is hoped that very soon it may be brought into working order. A Veterinary Assistant from either the Bombay or the Bengal Veterinary Colleges will be put in charge of this hospital temporarily until such time as he can be replaced by a graduate of the Madras Veterinary College.

10. As in last year, the staff consisted of only three Senior Veterinary Assistants. These were utilised not only for the cattle-disease work, but also such other work as falls under the management of this department, such as cattle-breeding, cattle-fairs, etc. For purposes of detail I submit below the work done by each assistant.

(*a*) From April to the commencement of July 1903 V. P. Subramania Mudaliar was in charge of the pony-breeding operations inspecting the Government stallions and their work. As I found that it was desirable to utilise his services to the important work of treatment of cattle-disease, I withdrew him from the pony-breeding operations and delegated him as occasion required for inoculation work. His head-quarters was consequently changed from Erode to Madras. He tried inoculation in three districts—Tinnevelly, Tanjore, and Nellore and inoculated in all 2,715 cattle for anthrax and more than one-half (1,509) cattle belong to Nellore. In the Nellore district it was reported by the local officers that ryots were not in favour of inoculation, but as I had not enough reliance on these reports, the veterinary assistant was sent to do what he can and it is satisfactory to notice that the ryots volunteered their cattle for inoculation as soon as they understood that the treatment is calculated to do more good than harm. Further cattle at the Koilpatti farm, as well as the home-farm cattle of the Sivagiri estate, under the Court of Wards, were protected against anthrax. In addition to this work he attended the marginally noted cattle fairs where Cattle Disease Act was enforced and worked in the Veterinary College hospital for nearly a month when one of the permanent incumbents proceeded on leave.

Appendix Form M.

Kalugumalai.	Muthulapuram.
Sivalaperi.	Sankaranayinárkóyil.

(*b*) M. Hassen aly Sahib was also on cattle-disease work and inoculated 2,394 cattle against anthrax in the districts of Malabar, Tanjore, Nellore, Chingleput and Tinnevelly. His work was chiefly in Tanjore and Tinnevelly districts where alone he inoculated 1,801 cattle. This prophylactic treatment was also adopted during the year by the military authorities of the Poonamallee cantonment and the Zamindar of Seitur in Tinnevelly district. He was deputed also in connection with the cattle fairs at Kalugumalai, Tiruchendur and Kanniseri, where the Act was in force.

Appendix Form M.

(*c*) Veterinary Assistant H. C. Sampathu Aiyangar was transferred permanently to the Gódávari and the Ganjám districts for cattle-disease duty. In these two districts either rinderpest or anthrax is always to be found. He successfully treated both rinderpest and anthrax and it was reported that ryots voluntarily sought his assistance. In Gódávari district he inoculated 2,043 cattle for rinderpest and 1,068 for anthrax in the Ganjám district, 762 cattle for rinderpest and 104 for anthrax. He was sent to Pithápuram at the request of the Collector of Gódávari to train veterinary assistant attached to Pithápuram Veterinary Dispensary in inoculation. The latter is now able to carry out inoculation independently and the necessary serum is supplied from this office. At the request of the President of the Kasimkota cattle show the veterinary assistant was asked to visit the show and render them whatever assistance they required. A separate report was submitted to Board regarding the particulars of this show. On information that an annual horse fair was to be held at Kotipalli near Rajahmundry he was ordered there to ascertain the nature of the exhibits gathered for the fair and also to help a merchant who was a large dealer in horses in the selection of good horses. His services were not required by the merchant as the fair was unexpectedly poor and no suitable ponies had been collected.

Appendix Form M.

11. Enquiries were made by me personally and by letter regarding the efficacy of inoculation on the sick cases and the reports from different quarters tend to establish the fact that the spread of the disease was arrested and the people generally were satisfied with the new treatment. Nine thousand and eighty-six cattle were inoculated during the year by the subordinates of this department and this may be considered to be very satisfactory considering the many difficulties the small staff of this department had to contend against.

12. *The Madras Veterinary College.*—The Madras Veterinary College was started in October 1903 in Vepery. Temporary premises have been rented but these only give the necessary accommodation for one class whereas in two years time there will be three classes at work simultaneously. A plot of land has been acquired, and when the buildings, the plans of which have already been submitted to Government for sanction are erected, the college should be the best equipped in India. The hospital formerly worked by the Madras Society for the Prevention of Cruelty to Animals, was very kindly handed over by them to Government and this formed the nucleus of the practice for instruction. There had been hundreds of applications from various parts for admission into the college. A very careful selection was made and according to the rules only 20 were selected for the first-year course. During the first three months in October, November and December 1903, the students were practically on probation and the term commenced from 1st January 1904. During the period two examinations were held by me—one at the end of December 1903 to determine the best students for Government scholarships and another before the vacation to test the progress made by them.

Brahmins 6.	Christians 3.
Other Hindus 8.	Mahomedans 3.

The statement of marks obtained by each student during each of the examinations is appended herewith :—

Names.	Examination held in December 1903, maximum 30.	Examination held in March 1904, maximum 50.	Remarks.
Abd-ul-Ghafúr, M.	14	36	
Brown, C.	24	34	
Doraisawmi Naidu, K.	13	37	
Devagi Rau	23	..	He left the college, as it came to my knowledge that he was a dismissed Government servant.
Ghias-ud-dín, B. M.	23	39	
Hayavadana Rau, C.	20	38	
Husain Hazari, M.	26	25	
Kannaiya Nayudu, M. P.	26	45	
Kristnasawmi Mudali, G.	29	46	
Kumarasawmi Pillai, T. G.	28	35	
Narasimhachari, V. G.	29	43	
Parthasarathy Mudali, A.	27	39	
Patankar, S. M.	30	46	
Rajuppa, A.	25	32	
Ramachandra Iyer, A.	19	33	
Ramalinga Mudali, A.	17	29	
Subramaniam, A.	17	39	
Srinivasa Iyengar, C. V.	..	26	He joined after the first examination. He is an F.A.
Wesley, J. M.	19	45	
Wilson, A J.	27	45	
Veerasawmiah	13	..	I removed him being unfit.
Ramalingam Nayudu	..	..	He was taken in the place of Veerasamiah, as being more suitable.

13. The students have shown generally considerable diligence to their studies and were regular in attendance. It is hoped that at the end of three years, the full term of the course, most of them will be able to obtain their diplomas and qualify themselves for district posts.

14. A library and museum is attached to the college.

15. For the teaching work, two lecturers including the Assistant Principal have been appointed during the year and the sanctioned staff will be entertained later on, when the second and third year classes are opened.

16. The office work of the Veterinary College and the Hospital is thrown on the establishment of the Civil Veterinary Department, and I have submitted certain proposals for re-organization of the office establishment during the year.

17. The Government Veterinary Hospital attached to the college is increasing in popularity every day and the following schedule exhibits the patients treated in this institution :—

	In-patients.	Out-patients.
Horses	212	126
Cattle	72	5
Dogs	157	192
Poultry	1	2
Monkey	...	1
Cats	5	4
Deer	1	...
Total ...	448	330
Grand total ...	778	

As an inducement to cattle-owners, I have notified that cattle-patients will be medically treated free of cost. This seems to have the desired object and the cattle-owners bring their cattle now more freely than before.

The charges for treatment and feeding have been very moderate and only minimum charges have been claimed. The collections for both in and out-patients until the end of 31st March 1904 amounted to Rs. 2,238-4-6 or an average of nearly Rs. 500 per month.

When the hospital was worked by the Society for the Prevention of Cruelty to Animals practically only horses and dogs were admitted for treatment. I am glad to say that owners are now bringing their cattle voluntarily and I anticipate a large cattle practice. If the municipal contractors' cattle were placed under our medical supervision a very large cattle practice could be assured. The few cattle in the hospital were sent in by the Police and thereby caused the hospital to become unpopular with owners of cattle, and this no doubt will account for the small number of cattle patients. To persons who are not very well off, advice and medicine are given free or at a very low charge.

18. In the compound of the "Dobbin Hall" premises a temporary cattle shed to accommodate about 30 cattle was erected during the year with cocoanut leaves but this has, however, to be replaced by a more durable and safe one.

19. A small plot of ground is cultivated with guinea grass at present and arrangements are being made to cultivate lucerne and also to grow some useful medicinal plants for the instruction of the students.

20. A tennis ground, a plot for the cricket pitch, as well as a gymnasium has been laid out for the physical training of the students and attendance at least to one of these has been made compulsory.

21. In conclusion, I beg to tender my sincere thanks to Board and to Government for the very favourable reception that they have given to the various proposals made by me for the development of the college. I express a hope that the general tendency of the people to recognise the good done to them that is now noticed everywhere augurs well for the future of this department.

MADRAS,
5th July 1904.

(Signed) W. D. GUNN, Major,
Supt., Civil Veterinary Dept.

APPENDICES.

MADRAS FORM A.

RETURN of pony and donkey stallions for the official year 1903–1904.

		Pony stallion.	Donkey stallion.
Balance on 1st April 1903		15	...
Increase	Purchased	...	...
	By transfer from	...	...
	Total	* 15	...
Decrease	Died	...	...
	Destroyed	...	...
	Sold	...	...
	Total	...	...
Balance on 31st March 1904		15	...

* Arab ponies.

MADRAS FORM B.

RETURN of pony and donkey stallions struck off the list during the official year 1903–1904,—*Nil.*

MADRAS FORM C.

RETURN of services and produce of pony and donkey stallions during the official year 1903–1904.

	Number at stud.		Number of mares covered.		Average of mares covered per stallion at stud.		Results of previous year's covering.			Average result of previous year's covering per stallion at stud.		
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Number of produce.	Number not held.	Number not known.	Average of produce.	Average of not held.	Average of not known.
1	2	3	4	5	6	7	8	9	10	11	12	13
Ponies ..	15	11	426	352	28	32	67	149	136	6·1	13·5	12·3
Donkeys ..	..	4	..	113	..	28	35	15	63	8·7	3·7	15·7

MADRAS FORM D.

RETURN of cost of feed, keep, attendants, etc., of pony and donkey stallions during 1903–1904.

District.	Number of stallions.		Total annual cost.		Average cost per stallion.		Remarks.
	Pony.	Donkey.	Pony.	Donkey.	Pony.	Donkey.	
			RS. A. P.	RS. A. P.	RS. A. P.		
Coimbatore .. Salem .. .. Madura .. Tinnevelly .. Gódávari ..	15	..	4,555 7 7	87 8 7	303 11 2	..	The donkey stallions were disposed of during the year.

MADRAS FORM E.

RETURN of ponies castrated by Salustries during the year 1903–1904.

District.	Number of ponies castrated.	Number of known deaths from effects of castration.	Remarks.
Coimbatore	74	....	....
Salem	17	....	....

MADRAS FORM F.

COMPARATIVE statement on cattle mortality for five years ending 1903–1904.

Causes of death.	1899–1900.	1900–1901.	1901–1902.	1902–1903.	1903–1904.
Diseases.					
Rinderpest	34,062	27,378	18,644	16,555	17,655
Anthrax	16,480	16,106	18,215	13,496	16,887
Malignant sore-throat	6,089	7,341	7,662	9,063	13,769
Black quarter	1,621	2,482	2,421	2,989	7,616
Epizootic aphtha	3,038	5,283	4,722	11,456	4,683
Variola	..	..	..	..	..
Others	40,239	38,951	37,333	35,417	32,548
Total ..	1,01,529	97,541	88,997	88,976	93,158
Other Causes.					
Snake-bite	2,019	2,028	1,761	2,109	2,278
Wild animals	11,840	11,564	10,811	10,937	10,886
Criminal poisoning	74	47	34	71	71
Total ..	13,933	13,639	12,606	13,117	13,235
Grand total ..	115,462	111,180	101,603	102,093	106,393

MADRAS FORM G.

STATISTICS of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during 1903–1904.

Districts.	Number of deaths among — Cattle — From diseases. — Rinderpest.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.
1	2	3	4	5	6	7	8	9	10	11
1. Ganjám	4,639	705	1,124	239	852	1,821	9,380	67	296	2
2. Vizagapatam ..	1,002	559	498	239	146	684	3,128	56	88	1
3. Gódávari	3,392	4,015	1,066	369	188	4,311	13,341	247	187	17
4. Kistna	1,623	920	2,484	762	175	4,956	10,920	231	93	10
5. Kurnool	414	777	462	624	147	2,436	4,860	98	443	2
6. Bellary	235	164	224	238	128	2,050	3,039	59	191	6
7. Anantapur	380	419	157	426	246	2,028	3,656	27	235	4
8. Cuddapah	475	607	272	2,445	191	1,033	5,023	47	358	6
9. Nellore	631	2,026	1,534	354	602	3,161	8,308	153	117	3
10. Chingleput	443	1,122	897	43	56	803	3,364	214	8	..
11. South Arcot	505	1,488	560	104	108	2,422	5,187	178	423	..
12. North Arcot	447	351	183	926	247	951	3,105	184	476	1
13. Salem	191	134	196	336	101	687	1,645	62	338	1
14. Coimbatore	242	201	203	204	171	1,596	2,617	72	742	10
15. Trichinopoly ..	371	253	146	11	57	1,316	2,154	63	25	2
16. Tanjore	723	2,108	2,675	75	110	380	6,071	186	1	1
17. Madura	832	489	287	24	74	823	2,529	112	163	1
18. Tinnevelly	368	363	174	82	16	477	1,480	101	28	3
19. Nilgiris	8	..	36	66	53	10	173	4	415	..
20. Malabar	694	179	440	25	247	158	1,743	105	2,219	1
21. South Canara ..	40	7	151	24	768	445	1,435	12	4,040	..
Total ..	17,655	16,887	13,769	7,616	4,683	32,548	93,158	2,278	10,886	71

Districts.	Number of Deaths among—*cont.* — Cattle—*cont.* — Total.	Grand Total.	Total stock by the latest census.	Horses and Ponies. — From diseases. — Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand Total.
	12	13	14	15	16	17	18	19	20	21	22	23
1. Ganjám	365	9,745	123,753	4	2	3	9	..	..	..	..	9
2. Vizagapatam ..	145	3,273	128,721	..	4	1	5	..	..	..	..	5
3. Gódávari	451	13,792	..	8	29	62	99	8	4	..	12	111
4. Kistna	334	11,254	1,105,431	1	2	26	29	..	10	..	10	39
5. Kurnool	513	5,403	176,229	2	2	14	18	1	17	..	18	36
6. Bellary	256	3,295	502,360	4	4	24	32	2	13	..	15	47
7. Anantapur	266	3,922	1,157,178	1	..	12	13	..	8	..	8	21
8. Cuddapah	411	5,434	942,078	..	..	3	3	..	2	..	2	5
9. Nellore	273	8,581	204,955	1	..	11	12	..	1	..	1	13
10. Chingleput	222	3,586	662,698	2	..	39	41	..	..	..	..	41
11. South Arcot	601	5,788	1,163,062	1	..	6	7	..	..	..	..	7
12. North Arcot	661	3,766	801,815	1	..	1	2	..	..	..	..	2
13. Salem	401	2,046	912,587	3	..	5	8	..	7	..	7	15
14. Coimbatore	824	3,441	1,151,637	1	1	7	9	2	19	1	22	31
15. Trichinopoly ..	90	2,244	609,139	..	..	3	3	..	..	..	..	3
16. Tanjore	188	6,259	936,740	..	..	6	6	..	..	..	..	6
17. Madura	276	2,805	695,008	1	5	29	35	1	11	..	12	47
18. Tinnevelly	132	1,612	482,925	..	1	4	5	1	..	..	1	6
19. Nilgiris	419	592	64,850	..	1	1	2	..	9	..	9	11
20. Malabar	2,325	4,068	908,983	1	..	3	4	1	3	..	4	8
21. South Canara ..	4,052	5,487	1,351,700	..	..	1	1	..	..	..	..	1
Total ..	13,235	1,06,393	..	31	51	261	343	16	104	1	121	464

MADRAS FORM H.

RETURN showing the Provincial cost of the Civil Veterinary department during the year 1903–1904.

Imperial.	Provincial.								
Salary and exchange compensation allowance of Superintendent, Civil Veterinary department.	Prizes at horses fairs and shows.	Establishment.		Travelling allowance.		Contingencies.	Purchase of stallions.	Stable, feed and keep.	Total Provincial.
		Officers.	Subordinates.	Officers.	Subordinates.				
1	2	3	4	5	6	7	8	9	10
RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.	RS. A. P.
Salary—		C.V.D.	C.V.D.	C.V.D.	C.V.D.	C.V.D.			C.V.D.
17,308 1 0		3,935 0 0	1,098 0 0	3,957 12 0	194 13 6	851 4 2			10,636 13 8
E.C.A.—		600 0 0							
1,081 12 0		(house-rent).							
			P.B.O.		P.B.O.	P.B.O.		P.B.O.	P.B.O.
			569 13 5	..	70 7 6	284 7 3		3,630 11 5	4,555 7 7
	M.B.O.							M.B.O.	M.B.O.
	75 0 0							87 8 7	162 8 7
Total 18,389 13 0	..	..	..	..	..	..	..	..	15,354 13 10

Nil.

MADRAS FORM M.

SHOWING results of preventive inoculation during the year 1903–1904.

Province.	Against rinderpest.					Against anthrax.				
	Number of outbreaks in which inoculation was undertaken.	Number of animals (if ascertainable) which died uninoculated in course of outbreak.	Method of inoculation followed.	Number of animals inoculated.	Number which died after inoculation.	Number of outbreaks in which inoculation was undertaken.	Number of animals (if ascertainable) which died uninoculated in course of outbreak.	Method of inoculation followed.	Number of animals inoculated.	Number which died after inoculation.
1	2	3	4	5	6	7	8	9	10	11
Madras	..	..	"Serum alone" method.	2805	12	..	..	"Serum alone" method	6329	33

MADRAS FORM N.

SHOWING total strength of subordinate veterinary staff employed during the year 1903–1904.

Province.	Paid from Provincial or District funds.	Number of Veterinary Inspectors.	Number of Veterinary Assistants.			
			Employed in Veterinary dispensaries.	Employed in work connected with horses and mule breeding.	Employed in work connected with cattle-breeding and cattle disease.	Total.
1	2	3	4	5	6	7
Madras	Provincial ..	..	..	..	3	3
	District Board.	..	1	..	..	1
	Court of Wards ..	..	1	..	..	1

STATEMENT of expenditure in the Madras Veterinary College from October 1903 to March 1904.

Heads.	Amount. RS. A. P.
Local allowance as Principal	500 0 0
Lecturers	1,187 3 7
Clerks and servants	316 8 0
Travelling allowance	333 8 4
Scientific instruments and apparatus ..	729 14 1
Drugs	142 11 6
Furniture	950 0 0
Repairs to furniture	52 14 0
Tour charges and office expenses	55 11 0
Miscellaneous	2,370 13 3
Scholarships	200 0 0
Purchase of books	999 2 0
Petty repairs to buildings	185 0 0
Rents, rates and taxes	452 14 5
Total ..	8,476 4 2

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

Read—Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 4136, dated 3rd August 1904.

The Hon'ble Mr. A. E. CASTLESTUART STUART, I.C.S.

ABSTRACT.—Submitting report on the operations of the Department of Agriculture for 1903–1904.

Order—No. 1049, Revenue, dated 20th September 1904.

Miscellaneous.

The report read above deals with the year's work of the Agricultural Department in all its branches, and His Excellency in Council is pleased to be able to congratulate the department as a whole on an interesting record of useful and increasing activity.

2. The report bears testimony to the variety of subjects that have engaged the attention of the department, but fewer experiments designed on a broader and clearer basis would doubtless give more satisfactory results. There is much truth in the Deputy Director's remark that there is great risk of confusion in attempting to study too large a number of varieties of the same crop. The development and organisation of the department have during the past year occupied the careful attention of Government, and they have now under their consideration various suggestions for its improvement made by Mr. Mollison in connection with his recent inspection of the Saidapet College. When effect has been given to the decisions arrived at, it is hoped that the efficiency of the department may be considerably increased.

3. In the matter of experimental agriculture, the most important departure in the year has been the establishment of the pumping stations alluded to in paragraph 20 of the report. The results already obtained by the Rev. Mr. Andrew's experiments at Melrosapuram (of which a full account has been published in his report printed in G.O., No. 849A, dated 5th August 1904), encourage Government to hope for a considerable development of the productive capacities of the poorer soils by improving the facilities for utilising sub-soil water. On the Government farms at Bellary and Koilpatti little of value has yet been achieved: and, while it is true that progress in experimental cultivation must necessarily be slow, the working of these farms can hardly be considered satisfactory. The Director's attention has already been drawn to the matter.

The sugarcane farm at Samalkot has been more successful, and Government are glad to observe that a beginning has already been made in the distribution of selected seed to the ryots of the neighbourhood.

4. In addition to his botanical survey the Government Botanist devoted much time to various enquiries in Economic Botany, the most important of which perhaps were in connection with the improvement of cotton, and his investigation of the pepper-vine disease in Malabar. The feasibility of starting an experimental pepper garden in Malabar is now under consideration. Recently proposals have been received for strengthening the Botanist's staff, and it is hoped that he will be able to devote more attention in future, as he desires, to the important study of insect pests.

5. The Madras Veterinary College was successfully inaugurated in October, but some time must elapse before it will be able to supply qualified veterinarians for want of whom the establishment of veterinary dispensaries has perforce been held in abeyance. It is very satisfactory to note that inoculation against cattle disease is growing in popularity, and Government trust that every effort will be made by the department to meet the demands of the ryots in this vitally important matter. To encourage the improvement of cattle-breeding, a sum of Rs. 1,000 has recently been allotted for the award of prizes at cattle shows, and the Board of Revenue has been asked to consider the best means of supplying breeders with selected bulls.

6. Mr. Mollison's report on his inspection of the Saidapet Agricultural College has recently been received, and the reorganisation of the College on a more efficient basis and the transfer of its control to the Agricultural Department is now under the consideration of Government.

7. Government are glad to observe that special efforts have been made to place the results of the researches of the department within easy reach of the ryot; but are of opinion that much more might be done in this direction. Elaborate bulletins are valuable as a means of recording the results of the department's work; but are mostly unintelligible to the rural community, whose interests will be better served by publications of a less ambitious character. Free use should be made of the village sheets of the District Gazettes to convey advice and information on all matters that are likely to be of interest to the ryots. But much the most satisfactory and immediately effective method is to send out qualified subordinates to explain and show the ryots the improved methods and their results when possible. In addition to the publications mentioned in the report, copies of M.R.Ry. Rajagopal Naidu's vernacular treatise on agriculture and of M.R.Ry. M. Venkanah's Telugu Manual of Agriculture have been distributed gratis and a vernacular translation has been ordered of the monograph on "Tanning".

(True Extract.)

(Signed) J. N. ATKINSON,
Ag. Secretary to Government

To the Board of Revenue (Revenue Settlement, Land Records and Agriculture).
,, the Educational Department.
,, the Inspector-General of Agriculture.
,, the Minister of Agriculture, Argentine Republic.
,, the Entomologist to the Government of India.
,, Monsieur Chailley-Bert.
Editors' Table.

Endorsement No. 1049A.

Copy to the Government of India, Department of Revenue and Agriculture.

(Signed) F. B. EVANS,
Ag. Under Secretary to Government.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY.

FOR THE OFFICIAL YEAR

1904-1905.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.
1905.

Maximum number of pages prescribed—

Agricultural Report	10	27
Government Botanist's Report	4	
Civil Veterinary Department's Report	13	

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REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1904-1905.

I.—PREFATORY.

THE post of Director of Agriculture was held throughout the year by the Hon'ble Mr. A. E. Castlestuart Stuart, I.C.S. During the same period Mr. Benson, Major Gunn and Mr. Barber held the offices of Deputy Director, Superintendent of the Civil Veterinary Department and Government Botanist, respectively.

2. The Director spent 102 days on tour, visiting all the districts of the Presidency, except the Nilgiris, Madura, Ganjám, Kistna and South Canara, and, in addition to his other work as Settlement Commissioner and Director of Land Records, inspected the agricultural experimental stations at Samalkota, Bellary, Hindupur and Koilpatti as also the pumping station at Attúr. He visited Nellore with a view to encourage the experimental cultivation by ryots of irrigated dry crops on black-cotton soils under the Ponnalur tank, opened the Agricultural Exhibition held in May 1904 at Conjeeveram in the Chingleput district, the Agricultural and Cattle Show held in January 1905 at Vizianagram in the Vizagapatam district and the Cattle Show held in February following at Ongole in the Guntúr district. He also inspected in September 1904 the vineyards of the Penukonda Agricultural Society and in November 1904 presided at the annual convention of the Tanjore Agricultural and Industrial Institution. In all the districts visited, opportunity was taken to encourage the formation of local Agricultural Associations and of Co-operative Credit Societies; while the benefits to be derived from well-irrigation by means of oil-engines and pumps were impressed upon the numerous landholders with whom the Director came into touch. The Deputy Director of Agriculture supervised the work on the Bellary and Koilpatti farms as well as the Hindupur fibre plantation which are under his direct charge and, besides visiting the Samalkota farm, toured in several districts for the following purposes, among others: the collection of pure cotton-seed for sale to ryots, the conduct of experiments in curing tobacco, the reclamation of saline soils, and the inspection of farms established, or the sites of farms to be opened, by Agricultural Associations and other public bodies and by private gentlemen. He attended, along with Mr. Barber, the first meeting of the Board of Agriculture held in January 1905 at Pusa. On his way back from Pusa he visited the herbarium of the Reporter on Economic Products at Calcutta. In March 1905 he accompanied the Officiating Inspector-General of Agriculture in his tour of inspection through this Presidency.

II.—SCIENTIFIC AND NATIONAL ENQUIRY UNDER IMPERIAL DIRECTION.

3. *Geology.*—The annual report of the Director, Geological Survey, has not yet been received.

4. *Entomology.*—Specimens of the locusts which appeared in the Kudligi and Bellary taluks, in the Tadpatri and Anantapur taluks, and in the Kurnool district, were forwarded to the Imperial Entomologist who found that all the specimens from the Bellary district except one belonged to the species of *Acridium succinctum* (Linn.)

or what is called the "Bombay locust", and the excepted one to the species of *Acridium aeruginosum* or the "Madras locust". The specimens from Anantapur could not be identified owing to the damaged condition in which they were received by the Entomologist, and no fresh specimens could be collected subsequently, while the species of locust that visited the Kurnool district was ascertained to be a male specimen of the "Bombay locust". Certain insects, resembling fire-flies, and locally known as such, appeared for the first time in several villages of the Ponnáni and Ernad taluks, Malabar district, and caused damage to paddy seedlings both while in nurseries or seed-beds and also immediately after transplantation. Two sets of specimens of these insects were sent to the Imperial Entomologist for identification: one of these sets was found to be new to the collection in the Imperial Institute, and was believed to be new to India, and it was accordingly sent to Europe for identification. The other was identified as "Rice Hispa" (*Hispa œnescens*), well known as a rice-pest in various parts of India.

5. *Imperial Institute.*—The Department continued to supply specimens of economic products to the Reporter on Economic Products. Specimens of about 50 products were forwarded to him during the year, as also the seed of different kinds of crops grown in this Presidency and additional specimens of yams (*Dioscoreas*) and sorghums. Amongst other articles forwarded to him were specimens of mats manufactured in the different districts of the Presidency together with the prepared material and dry botanical specimens of the plants used, specimens of flowers, leaves, fruits and seed of the Arnotto dye plant obtained from Mysore and some specimens of chilli plants obtained from Madura.

6. One hundred young cardamom plants from Kodaikánal and 2 lbs. of the best variety of potatoes grown in the Nilgiris were forwarded to the Director of Land Records and Agriculture, Assam, for experimental cultivation. Similarly, a small quantity of the seed of *Salicornia brachiata* was obtained from the Collector of Tanjore and supplied to the Director of Land Records and Agriculture, United Provinces of Agra and Oudh, while certain ginger seed bulbs from Travancore and seeds of two varieties of tobacco from Dindigul were forwarded to the Director of Land Records, Bengal. As stated in paragraph 6 of the report for 1903–1904, a second consignment to the West Indies of a Wardian case containing well-established plants of Cochin lemon grass was forwarded at the beginning of the year under report; but as that too was received in a damaged condition, steps are being taken to make another consignment when seeds will also be sent if possible. Specimens of vegetable food gathered and used by the poorer classes of people in times of scarcity or famine continued to be received during the year, and were duly forwarded to the Reporter on Economic Products.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

7. The two agricultural probationers who had been receiving practical training at the farms of the Bombay Presidency returned during the year; and one more probationer was entertained and sent to Bombay for similar training.

The permanent experimental farms at Bellary and Koilpatti and the temporary farm at Samalkotá were at work during the year. On a consideration of the results attained on the last-mentioned farm during the probationary period covered by the three previous years, Government sanctioned the proposal to place it on a permanent footing. A new temporary farm was established at Palúr in the Cuddalore taluk, South Arcot district, with the object of studying the diseases and of promoting the improvement of the ground-nut, and steps were taken to open a permanent farm at Taliparamba in the Chirakkal taluk for making a thorough investigation of the pepper-vine diseases prevailing in the Malabar district.

8. At both the Bellary and Koilpatti farms, the experimental work consisted mainly in endeavours to determine the comparative value of the various methods of collecting and utilising cattle manure and the extent to which deep tillage would operate as a remedy for the evil effects of drought. Little information of a practical character was yielded by the manurial experiments at Bellary, owing mainly to the damage and loss of manure caused by the very heavy rainfall in September and October

1904 and to the fact that some of the manure applied to the manured plots was found to have been carried to the adjoining unmanured plots. The latter cause appears to have affected the outturn of an unmanured plot at Koilpatti also; but otherwise, the results attained at the latter farm were, on the whole, in accord with what might have been expected. As regards deep tillage, the effect of it was greatly lessened at the Bellary farm by the exceptional rainfall in May and June 1904 and the results were contradictory to a considerable degree, whereas at Koilpatti the four plots experimented upon yielded a much larger outturn than all those tilled in the manner usual in the district except the single unmanured plot mentioned above.

9. At the Bellary farm, the following food crops, viz., sorghums of a number of varieties, local and foreign, cumbu, red gram and korra, were sown in addition to cotton either with a view to the selection of seed or in the ordinary course of farm management. Owing to the unfavourable character of the season, the korra practically failed and none of the varieties of sorghum except the late sorghum yielded a fair outturn, but the pulse crops did fairly well. The seeds of the several sorts of the local early sorghum and of the fodder sorghums and other foreign sorts obtained from Bombay have, however, been collected with a view to their being further tested. In the case of ragi, an attempt was made to contrast the comparative value of the ridge-and-furrow and flat-bed systems of planting, but the experiment was mostly frustrated by the excessive rain of October 1904.

10. At the Koilpatti farm also the season was unfavourable: the deficiency in rainfall in the early part of the year retarded farm work until the begining of October 1904, and the subsequent general failure of rain and consequent scanty supply of water in the farm wells rendered it difficult to bring to maturity some of the crops grown on the plots devoted to the experiments mentioned in paragraph 8 *supra* and also affected almost all the other crops, unirrigated as well as irrigated. The more important crops, other than cotton, that were grown in the farm, were Irungu sorghum, chola-nattu and cumbu. Irungu sorghums were partially saved with the aid of well water and classified into 17 sorts, and enough seed has been collected for further trial. Chola-nattu was sown on 13 acres but yielded a very poor outturn. In order to determine the best time for cutting the crop from a fodder point of view, small plots of this area were cut at different stages, and the samples of the fodder were analysed by the Agricultural Chemist to the Government of India: the results of the analyses and the figures of outturn indicate, in the Deputy Director's opinion, that the quantity and character of the fodder are at their best when the grain is in the "milky stage," but the test will have to be repeated several times before the investigation can be pronounced to be complete. Three Bombay varieties of cumbu as well as the local variety were sown on four acres but the yields were poor: one of the former (namely the Awned variety) yielded the largest outturn, viz., 266 lbs. of grain and 526 lbs. of straw per acre and suffered comparatively little from the depredations of birds. Other crops were also grown as incidents of ordinary cultivation, such as ragi, paddy, chillies and onions, sweet potato, brinjals, tobacco and Berseem or Egyptian clover. The following points about these crops deserve special mention:—

Owing to scarcity of water the attempt made to test the relative merits of the ridge-and-furrow and flat-bed systems of planting ragi failed just as the similar experiments at Bellary failed from excess of rainfall. It may, however, be said generally that less water was used, and the yield per acre was greater, under the former system than under the latter. Onions planted on a 15 cent plot yielded at the rate of 6,400 lbs. per acre but the outturn of those raised from seed—a method not usually adopted by ryots—on a small portion of the area was 10,100 lbs. per acre. Owing, however, to the smallness of the area experimented on and the unfavourable character of the past season, the experiments require to be repeated on a larger scale. As the tobacco crop did not flourish under hand-watering, a new method was adopted, viz., of hoeing the land as often as possible during the growth of the crop and allowing water only into every second furrow as required: as a result, the crop grew well and required less water. An attempt was also made to improve on the local practice of curing the crop, but the results are not yet known.

11. *Sugarcane.*—At the Samalkota farm, the area under sugarcane was increased from 8 to 13 acres. A cyclonic storm which occurred in October 1904 caused damage to the extent of Rs. 400; the growth of the canes was otherwise not affected,

as the water-supply in the canals was adequate throughout the year. The experimental plots were, as usual, divided into three classes, viz., the varietals, the manurials and the methods plots.

The *varietals* were sub-divided into classes A and B; class A included canes suitable for detailed study and extended cultivation as well as for eventual distribution to ryots. Class B consisted of canes of little primary importance. The varieties falling under class A were studied at their various stages of growth, and the juices of the promising kinds were carefully analysed with the result that the "white Mauritius" and the "striped Mauritius" have been selected for distribution among ryots during 1905–1906. In the case of the sorts falling under class B, notes were taken regarding their germination and growth: two of these, viz., the "Ashy Mauritius" and the "Red sports," appear to be even better than the "striped Mauritius".

In the *manurial plots*, the effects of various manures were tested. As the result of past experience at the farm, the experiments were confined mainly to testing the local oil-cakes. The manures applied were castor-cakes in small and large quantities of 10 and 30 bags, respectively, per acre, pungam and margosa cake combined, cattle manure and a general manure containing artificial fertilisers. The results tend to show that, in the particular plots experimented on, chemical manures and the local cattle manure were ineffective and that about 15 bags of castor-cake per acre or about 20 bags of mixed pungam and margosa cake which would be considerably cheaper, are calculated to produce the best results.

On the *methods* plots, a single variety, *yerra cheruku*, was planted in different ways or received different methods of cultural treatment. The following results of these experiments deserve mention:—

(i) The relative advantages of planting the cane by its upper and lower ends were tested on equal plots; though the germination was better and the number of shoots produced was greater with the upper halves, the weight of the canes and the amount of jaggery produced was greater from the lower ends.

(ii) With a view to determine the number of sets per acre that could be planted with advantage, two ten-cent plots were planted with 20,000 and 30,000 sets per acre, respectively; the latter produced better results in all respects, but the experiment is inconclusive and further trials have to be made.

(iii) Certain plots were devoted to testing the effect of green dressing and mulching, but though, owing to a mistake in the conduct of the experiments, very few cane shoots appeared, they showed a great tillering power, and the canes were also thicker and contained excellent juice.

(iv) Two plots were laid out for the purpose of determining whether canes could be grown either without being wrapped to or supported by bamboos at all or by allowing them to merely lean against the sides or railings of square compartments made of bamboos. Though the plots were blown down by the hurricane in October 1904, the plants were allowed to grow with the result that the few canes harvested proved to be of excellent size and quality: and in fact one "bamboo railing" which had not been much damaged yielded the highest weight of canes and the largest quantity of jaggery, *i.e.*, at the rate of 13,520 lbs. of jaggery per acre.

Besides the above-mentioned special experiments, certain others of a general character were made, the more important of which are mentioned below:—

(i) With a view to gradually evolve disease-resisting varieties of good quality, a "*disease plot*" was started during the year under report, in which canes of various kinds which showed signs of disease were grown in rows and healthy canes found in diseased areas were planted between the diseased rows. Though the germination was fair, almost the whole of the plants died, and there was difficulty in obtaining sufficient sets for experiments in 1905–1906.

(ii) The question of producing a cane in delta land which will ripen in nine months engaged attention, as this is a matter of considerable importance in cases where, as in tracts like the Kistna delta, irrigation is available for only nine months in the year.

(iii) The observation of "*sports in canes*" being one of the ways whereby new varieties may be obtained, experiments were made in this direction during the year, with the result that the striped Mauritius has been found to sport into red and white

canes. Both these sports were analysed; and it was found that, while the white sports appear to be similar to the striped Mauritius, the red sports excelled all the other canes of the farm in richness of juice.

Red Mauritius canes were widely distributed throughout the Gódávari district, the demand for them on the part of the ryots being extraordinarily great. The results of the cultivation of this variety by the ryots were highly satisfactory and the cane was unanimously pronounced to be vastly superior in all respects to the local canes. The Red Mauritius variety having been fairly launched into the delta taluks, two new varieties, *viz.*, the striped Mauritius and white Mauritius, were towards the close of the year under report distributed for trial to a single ryot in each taluk, who was specially selected for the care with which he had previously grown the Red Mauritius.

12. *Groundnut.*—The importance of the groundnut in the South Arcot district and the prevalence of the disease mentioned in paragraph 13 of the previous report induced the Government Botanist to make a careful study of this crop. A temporary farm was started in the district to arrest the deterioration of the industry and to introduce disease-resisting and improved varieties of groundnut; it was also thought desirable to make use of this farm as a nursery for the distribution of the Samalkota sugarcanes over the southern districts of the Presidency and to introduce improved varieties of cane into the South Arcot district. A farm consisting of 9 acres of dry land and 5 acres of wet land was accordingly opened in the village of Palur, Cuddalore taluk, towards the close of the year. The lands were enclosed and planted up with several varieties of groundnut and sugarcane and with a number of varieties of indigo as a rotation crop: an office and a cattle shed were also erected before the close of the year.

13. *Pepper.*—As stated in paragraph 24 of the previous report, the diseases in pepper plantations in Malabar were investigated and reported upon by Mr. Barber; and enough information was collected to suggest the lines on which the diseases should be studied and remedies sought. The Wynaad Planters' Association, at whose instance the original investigation was made, requested that he might again be deputed to the Wynaad, but the request could not be complied with. Enquiries were at the same time made as to whether, having regard to the magnitude of the interests involved and the affected area of the pepper gardens in the plains where the disease was reported to be no less virulent than in the Wynaad, it would not be advisable to establish a pepper farm in the former tracts for the conduct of an organised series of experiments into the nature of the pests and the requirements of pepper cultivation; and as the result of such enquiries, Government decided to open a special pepper farm. A suitable site was selected at Taliparamba in the Chirakkal taluk, and much preliminary work was done before the close of the year though the land was not formally acquired till sometime later.

14. *Cotton.*—At Bellary, as proposed in paragraph 12 of the previous report, those varieties of cotton which local experts had declared the most valuable continued to be grown, but the season was unfavourable to the cotton crop generally and it was not possible to obtain any quantitative results. The produce collected under the system of selection has been submitted for expert opinion. The seed obtained from the flowers crossed in 1903–1904 was all carefully sown in separate plots but the result was not encouraging. This portion of the crop showed no increase in vigour and was further very irregular, and the lint produced was generally of inferior quality. The irregular growth is to be attributed to the fact that the crossing in 1904 was carried out before it had been discovered that many variations existed amongst what were apparently plants of the same sort. Further selection from the most promising of these crossed plants has been made for sowing again in 1905–1906. Besides this, a large number of flowers on specially selected cotton plants of several of the sorts commonly found locally, were crossed during 1904–1905, and the seed obtained has been set aside for future sowing.

The American varieties alluded to in the report for 1903–1904, as well as the Peruvian cotton therein mentioned, were again sown, as also the seed of what turned out to be an American variety which was obtained from the Hadagalli taluk of Bellary, where it is sown as "Bombay cotton" and was stated by the Collector to be a relic of the efforts, made some 40 years ago, to introduce Hinginghat and other

fine sorts into the district. None of these crops flourished and it is not proposed to proceed further with them, but the Peruvian cotton is still standing and will not be removed until after the results of the 1905–1906 harvest are known.

At the Koilpatti farm, attention was almost entirely confined to the two local varieties (Uppam and Karanganni), and probably enough pure lint of each has been obtained to allow of a definite determination being made of their relative merits. The season was not, however, favourable to a determination of their relative producing capacities, and the harvest has not been completed. One noticeable feature may, however, be mentioned, viz., that the advantage of sowing cotton in drills or lines instead of broadcast came out very strongly in an unfavourable season like the past one, and the farm crop, which was almost entirely sown in lines, grew much better than those on neighbouring land, a result which is explained by the far better tillage which this method of sowing permits of. As at Bellary, the seed obtained from crossings made in 1903–1904 was all very carefully sown and with very similar results; that is, that the plants produced showed no increase but rather a decrease in vigour; much of the seed was infertile; but as yet no opinion can be offered as to the lint produced. During the year under report, selection and crossing of the two local sorts was continued and the seed thus obtained will be reserved for sowing in 1905–1906.

At this farm a variety of cotton (Cambodia cotton) introduced by the Chamber of Agriculture, Pondicherry, into the Trichinopoly district was sown for experiment, and it promises to prove useful on black soil. Besides this, the American cottons alluded to in the previous report were all again sown on the red soil block, but owing to the deficiency of water in the wells they did not flourish, and it is not possible to say from the experience of 1904–1905 whether or not there is an opening for such cottons on this class of land in Tinnevelly.

With a view to improve the quality and outturn of the cotton grown in this Presidency generally by distributing to ryots the best seeds available, an effort was made, at the instance of the Government of India, to collect good seed of the best local sorts in several localities, viz., Bellary, Nandyal and Tinnevelly, directly by departmental arrangement and partly with the aid of Messrs. Harvey Brothers at the last-mentioned station, and in smaller quantities at Tadpatri, Kurnool, Jammalamadugu and Nandigáma, through the agency of the Revenue department. Except in Tinnevelly, it has been found impossible to collect really pure seed and the crops of the ryots were found to be in a state of hopeless mixture. Although mixing is fairly widespread in Tinnevelly, yet it is not universal and in parts of the district the two sorts are to be found grown practically pure. Arrangements are now being made for the distribution of this seed to the ryots at a reasonable price.

15. *Tobacco.*—The Government Botanist having in his report on the inspection of the Bombay Agricultural farms in 1903–1904 suggested that there was a most interesting and extensive field for enquiry and experiment in the matter of tobacco cultivation in this Presidency, Government ordered enquiries to be made of the leading tobacco manufacturers as to the directions in which the varieties already grown were capable of improvement. These enquiries showed that there were defects in the methods followed in this Presidency, both as regards cultivation, including harvesting, and as regards the curing of tobacco, and that the chief desideratum of manufacturers was the production of a "wrapper" leaf of good colour and requisite "burning qualities". No great advance could be made in the rectification of these defects pending the appointment of an Agricultural Chemist; but the practice of the growers of tobacco in and around Dindigul—the chief centre of tobacco cultivation—was observed in all its details during the year, and the improvements suggested by such observation have been embodied in a revised bulletin No. 4 published since the close of the year. In regard to harvesting and curing, arrangements were made with the co-operation of Messrs. Spencer & Co.'s agent at Dindigul to secure 15 pothies of good tobacco (valued at Rs. 1,000) notwithstanding the unfavourable character of the season, but the result of the curing operations is not yet known.

The Inspector-General of Agriculture has, since the commencement of the above-mentioned observations and experiments, expressed the opinion that the extraordinary variation in the produce of gardens in the same locality and apparently similar in all

respects can only be attributed to differences either in soil or in the water of the wells used for irrigation, and that this is a problem that can be approached only with the aid of an Agricultural Chemist; the question of growing tobacco departmentally has therefore been deferred pending the appointment of such an officer.

In 1903, seeds of five varieties of tobacco received from the Inspector-General of Agriculture were sown by selected ryots in the Madura, Coimbatore and Gódávari districts, by Messrs. Spencer & Co.'s agent at Dindigul and by Mr. Barry at Cocanada. In Madura none of the varieties except one did well; and even the leaves of the excepted variety were not as large as those of the indigenous species. In the Coimbatore district the seedlings of three varieties perished, while the growth of the others was stunted and the yield was practically *nil*. In the Gódávari district, the ryots who tried the seeds stated that the produce was less valuable and less useful than the country tobacco; and Mr. Barry who sowed them on lanka lands could not obtain a proper outturn as the season was too wet, and the tobacco was also of bad quality and small size. On the other hand, the experiments conducted by Messrs. Spencer & Co. were more successful and their method of cultivation especially in regard to the topping of the plants resulted in the production of a fairly good leaf.

16. *Aloe plantation.*—Of the three varieties of hemp referred to in paragraph 15 of the previous report, *agave sisalana* showed an extraordinary variation in growth, while *agave cantula* made little or no growth. To try the effect of cultivation on the growth of the plants, the sisal plants were hoed round during the year; the plots were further cleared of grass and weeds to prevent accidents by fire. Doubts having been felt during the year as to the relative values of certain methods of cultivating agave, such as clearing and leaving the land to nature, draining and not draining it, growing the plants under shade and exposing them to the sun, steps have been taken to test these methods and their results as far as possible on separate plots. Further, it being desirable to obtain some data as to the output by dealing with the leaf already available in the farm for cutting, arrangements have, since the close of the year, been made for the training of an agricultural probationer by the Secretaries to the Indian Fibre Company in the best method of extracting the fibre by hand.

17. *Foreign varieties of paddy.*—Seeds of 22 good varieties of paddy grown in Bombay, Central Provinces and Bengal were received from the Inspector-General of Agriculture in 1903 and tried in 1903–1904 and 1904–1905, at the farm attached to the Agricultural College, at the Koilpatti farm, and on the estate of a landholder in the Shiyali taluk of the Tanjore district. The crops on the College farm in 1903–1904 having been seriously damaged by heavy rain and wind, and to a small extent by insect-pests also, a further trial was made under well irrigation in 1904–1905: but the experiments were on the whole inconclusive owing to their having been made on very small plots and a further trial will be made in 1905–1906 on a larger scale with a smaller number of sorts. The results achieved at the Koilpatti farm in 1903–1904 were referred to in paragraph 10 of the previous year's report; in the year under report three varieties were planted at the farm, *viz.*, Banko, Halki and Ambemohur. The last-mentioned variety did not flourish but the Banko and Halki yielded fairly at the rate of 2,062 lbs. and 1,662 lbs. respectively per acre. The experiments made in the Tanjore district in 1903–1904 yielded no results of value. The Banko, Halki and Chinnore varieties were tried again in 1904–1905; the yield per acre in the case of the first-mentioned variety was 1,044 measures on land of more than average fertility and 777 measures on land of less than average fertility, while Chinnore and Halki yielded at the rates of 686 and 360 measures respectively per acre. The landholder is of opinion that Banko will be a valuable substitute for the locally-grown Kadappu and Vadansamba varieties, being superior to them both in point of yield and quality, and that owing to its capacity to withstand scarcity of water it is also suitable for cultivation on high level lands.

18. *Indigo.*—At the Agri-Horticultural Gardens, Madras, the experimental cultivation of the several varieties of indigo mentioned in paragraph 14 of the previous report had to be abandoned owing to the poor character of the soil. They were accordingly planted in the farm attached to the Agricultural College at Saidapet, but, owing to the unfavourable character of the season, the experiment was not successful. Seeds of *Indigofera longeracemosa*, *Indigofera arrecta* and Delhi indigo and several other varieties obtained from various parts of this Presidency were sown

towards the close of the year as a rotation crop on the groundnut farm referred to in paragraph 12 above: the germination in all these cases except *Indigofera arrecta* was good.

19. *Sunflower.*—As stated in paragraph 16 of the previous report, the Reporter on Economic Products suggested the cultivation of other kinds of sunflower than the Russian giant variety. The ordinary garden variety was accordingly cultivated at the Coimbatore Jail, and the oils yielded by both that and the Russian giant varieties were sent to that officer who states that there is scarcely any difference in the properties of the two oils.

20. *Saline soils.*—The experiments conducted during the year under report in the reclamation of saline soils under the Periyár Project did not produce useful results owing mainly to the unfavourable character of the season and the consequent deficiency of water-supply. The plots, however, presented a more promising appearance at the close of the year than they had done before, presumably on account of the application of gypsum and leaf manure, and the experiments will therefore be continued during the current year. The soil of the alkaline plots in the Bellary farm experimented upon in 1903–1904 was reported by the Agricultural Chemist to "drain very badly." As, in the case of such soils, reclamation by the growth of herbage would take much time besides being uncertain in result, a new method of treatment was decided on, viz., to bring the whole area to a uniform and reasonable slope and then apply bone manure with a view to open out the soil and induce better drainage.

21. *Paspalum dilatatum.*—About 60 lbs. of the seed of this valuable fodder grass were received from the Conservator of Forests, Central Circle, and distributed to the leading ryots and Agricultural Associations in this Presidency for experimental cultivation. The seed was also sown at the Samalkóta, Bellary and Koilpatti farms; some plants were with difficulty raised at the first-mentioned two farms. At Koilpatti, the seed was sown in a nursery in September 1904 and the seedlings were transplanted on 12 cents in November: and, under careful treatment, the first cutting in April 1905 yielded 1,229 lbs. of green fodder.

22. *Nitrogen-fixing bacteria.*—A small quantity of nitrogen-fixing bacteria was obtained from America; but, as it was found unsuited for application to leguminous crops grown on the plains, it was forwarded to the Curator, Government Botanic Gardens and Parks, Ootacamund, for trial.

23. *Agricultural Exhibitions and Associations.*—An Agricultural Exhibition was held in May 1904 at Conjeeveram in the Chingleput district, to which a contribution of Rs. 500 was sanctioned by Government on certain conditions. Agricultural Exhibitions and cattle-shows were held by the Tanjore Agricultural and Industrial Institution in connection with its annual convention at Tanjore in November 1904 and by the Vizagapatam District Agricultural Association, at Vizianagram, in January 1905; another Agricultural show was held in March 1905 at Pedakallapalli in the Kistna district. During the year under report proposals for the formation of a Central Agricultural Committee—which has since been established—in connection with the Victoria Technical Institute were under consideration, and District Agricultural Associations were formed at several of the centres visited by the Director of Agriculture.

24. *Pumping experiments.*—During the year under report, pumping experiments with oil engines were carried on at Kadiampatti, Saidapet, Cuddalore, Manamadura, Melrosapuram, Coimbatore, Attur and Villupuram, the experiments conducted at the four last-named places having been transferred in July 1904 from the Public Works Department to the control of the Board of Revenue. Proposals for the opening of a pumping irrigation farm on the banks of the Hagari in the Bellary district for the conduct of experiments with the irrigated cultivation of black-cotton soils and the determination of the duty of water were under consideration; and towards the close of the year, Government called for detailed proposals which have since been submitted. Pumping experiments were also carried on by private enterprise at Kattalai and Trichinopoly with the assistance and advice of the Supervisor in charge of pumping experiments. The report on the results of the experiments at Melrosapuram, submitted by the Rev. Mr. Andrew was translated into the chief vernaculars of the Presidency and

ordered to be published in the village sheet of the District Gazette, and Mr. Chatterton has been requested to collect the results of the experiments and place before the public reliable statistics as to the quantity of water obtainable by means of oil engines and the extent of dry land which they can be expected to irrigate.

M.R.Ry. S. Rajagopalasawmy Mudaliar, Supervisor, was in charge of the pumping experiments almost throughout the year during the absence of Mr. Chatterton on furlough.

25. *First Meeting of the Board of Agriculture at Pusa.*—With reference to the proceedings of the first meeting of the Board of Agriculture referred to in the concluding portion of paragraph 2 above, steps are being taken in the direction, among others, of starting additional farms for the study and improvement of cotton and for cultivating jute departmentally with a view to see whether it can successfully be grown in the Gódávari and Kistna delta.

26. *Experiments in the irrigation of dry crops on black-cotton soils.*—Experiments in the irrigation of black-cotton soils to a limited extent were conducted through the agency of ryots holding lands under a tank newly constructed at Ponnalur in the Nellore district. About 740 acres of dry crops were lightly watered, and the irrigation was found to have done no harm to the black-cotton soil lands.

27. *Meteorology.*—The rainfall registered at the rain gauge stations was tabulated as usual and the results published by the Meteorological Reporter to the Government of Madras. The total number of stations in the Presidency at the end of the year was 454 (inclusive of 76 in the Native States) or nineteen more than at the end of the previous year; and of these, 362 stations were inspected.

28. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction :—(1) Monthly season reports in three sections (rainfall, cultivation and prices of food-grains and salt); (2) annual crop forecast reports; and (3) quarterly reports of cattle mortality.

29. *The Madras Agri-Horticultural Society.*—The income of the society from various sources including the Government grant of Rs. 4,000 amounted to Rs. 18,462. The usual flower-show was held on the 27th February 1905 at the nursery gardens of the society and was, on the whole, up to the average of the previous years notwithstanding the adverse character of the season.

IV.—BOTANY.

30. A detailed report on the work done by the Government Botanist is appended. Much attention could not be paid to the *systematic botanical survey* of the Presidency during the year, owing to the fact that the time of the Government Botanist and his staff was occupied mainly with economic and general agricultural work. An attempt was made to form an authoritative "Sandal flora" of the chief sandal-bearing tracts of Mysore, but though this work was rendered difficult owing to the prevalent drought, the opportunity was taken to make a collection of the haustoria of the sandalwood attached to different plants for comparative study. A close study of the sandal haustoria was undertaken, and the results of the investigation were published in the *Indian Forester*. Considerable collections of the various Loranthaceæ (parasites), which ravage the forests of this Presidency, were made in all stages of their development. Attention was paid to the herbarium: about 2,000 sheets were mounted during the year, and these were made up of 1,000 from the Gódávari gorges, 700 from the Wynaad and 300 from the Kistna uplands, but, owing to want of time, a large portion of the specimens mounted in this and previous years could not be written upon. The study of plant diseases generally received a check owing to the absence of skilled assistants and the necessity of employing the whole staff on general agricultural matters. No large additions could therefore be made to the previous collections of fungi and insect pests.

In connection with *economic botany*, the Government Botanist made a thorough study of the ground-nut, sugarcane and indigo crops in the South Arcot district and the pepper plantations in Malabar with the result, already stated, that a temporary ground-nut farm and sugarcane nursery was opened at Palur in the former district and the necessary steps were taken to establish a permanent pepper garden at

Taliparamba in the latter district. A thorough study was made of the agaves of this Presidency and the uses to which they are put in the different districts, and the results were intimated to the Superintendent of the Calcutta Botanical Gardens for publication in the form of a bulletin. For various reasons, no great progress was made in the collection of economic plants, but the development of this branch of the herbarium work received marked attention. The fungus disease affecting palmyra trees in portions of the Gódávari district was studied during the year, and as the result thereof, the Inspector-General of Agriculture was requested to depute the Imperial Cryptogamic Botanist for making a thorough investigation of the disease. The other contributions of the Government Botanist to economic botany have been noticed under section III.

V.—VETERINARY.

31. The detailed report on the operations of the Civil Veterinary Department is appended. The Madras Veterinary College worked well during the year. The teaching staff of the College was strengthened by the appointment, in January 1905, of a second lecturer. The students whose term commenced in January 1904 did well both in practical and theoretical work at the annual examination held in December 1904 by the Superintendent, Civil Veterinary Department, and *ex-officio* Principal, and all of them obtained promotion to the higher class. A fresh batch of 20 students commenced their term in January 1905. The students received instruction free of charge, and 20 of them (10 in each of the two classes) held scholarships sanctioned by Government.

32. *Veterinary dispensaries.*—As in previous years, the establishment of Government Veterinary dispensaries at mufassal stations generally remained in abeyance for want of local men qualified to take charge of them; the opening of a dispensary at Rajahmundry, where one was urgently wanted, was, however, sanctioned by Government, and though a Veterinary graduate was sent for from Bombay, it was not started during the year pending the selection of a suitable site. There were in all five dispensaries at work in the Presidency, of which two were attached to the Veterinary College at Madras and to the Agricultural College at Saidapet respectively and maintained by Government, two more were kept up by the District Boards of Trichinopoly and Madura, and the fifth by the Pithápuram estate under the management of the Court of Wards. The dispensaries were all of them popular, and the cattle practice grew apace. At the dispensary attached to the Veterinary College, horses and dogs formed the bulk of the patients.

33. *Cattle disease.*—Preventive inoculation against cattle disease was continued during the year. The work was carried on in the districts of Ganjám, Vizagapatam, Gódávari, Guntúr, Nellore, Chingleput, South Arcot, Tanjore and Tinnevelly, and the total number inoculated against anthrax and rinderpest rose from 6,329 and 2,805 in 1903–1904 to 12,437 and 8,251, respectively, in the year under report. With increased facilities for the supply of serum and with the strengthening of the staff of Veterinary Assistants, when graduates of the Local Veterinary College become available, a considerable development of this branch of work may be looked for.

34. *Pony-breeding operations.*—One of the stallions lent to private breeders in the previous year having died, the number at work was only 14. Of these, eight stood in the Coimbatore district, four in Salem, one in Madura and another in Trichinopoly and, latterly, at Ootacamund. The total number of mares covered was 356 against 426 in the previous year, giving an average of 25 mares per stallion against 28 in the previous year. The decrease in the average is attributable mainly to one of the stallions having been under treatment in Madras for some time and to his having covered only four mares during the year. Of the 426 coverings in 1903–1904, the Superintendent has ascertained the results in 293 cases only; 110 cases were successful though six of these aborted, and in 183 cases the results were *nil*. The results are not traceable in 66 cases owing to the sale of the mares, and reports from Revenue officers are due in the remaining 67 cases.

Sixty-three entire ponies in the Coimbatore district and sixteen in the Salem district were castrated against 74 and 17 respectively, in the previous year. There were two deaths among castrated subjects, and compensation was paid to the owners.

35. *Pony and cattle shows and cattle fairs.*—No pony shows were held during the year. The Madras Cattle Disease Act (II of 1866) was put in force at most of the cattle fairs held in the Tinnevelly district; and in nine of these, Veterinary Assistants helped the local authorities in carrying out the provisions of the Act. Cattle shows were held at Vizianagram in the Vizagapatam district, at Ongole in the Guntúr district and at Conjeeveram in the Chingleput district. Government contributed Rs. 500, from Imperial Funds, towards the prizes awarded at the Vizianagram Show and a similar sum towards the Ongole Show, besides granting medals for the best cow and the best bull and certificates to all prize-winners. At the Ongole Show, cattle to the value of Rs. 10,000 were sold—an illustration of the commercial value of such Shows, apart from their educative effect.

36. *Cattle-breeding.*—With a view to promote a general improvement of stock or at least to prevent the deterioration thereof, Government considered it desirable to provide selected persons with breeding bulls, and directed that enquiry and inspection should be made in the neighbourhood of the breeding districts in order to select the most congenial localities and the most suitable persons for the conduct of the experiments. Proposals on this subject were under consideration during the year.

VI.—AGRICULTURAL EDUCATION.

37. The arrangements in vogue in previous years for imparting instruction in agriculture to the minors under the Court of Wards at Newington continued to be in force during the year. Mr. Benson, the Deputy Director of Agriculture, examined the minors once in September 1904 and again in the early part of April 1905 and made certain suggestions with a view to improve the method of instruction; these suggestions are now under the Court's consideration.

38. *Higher education.*—The College of Agriculture continued to work under the revised curriculum introduced in the year 1902–1903. The number of students on the rolls showed an increase from 46 to 58—the direct result of the greater interest that has recently been aroused in agriculture in the Presidency. The Sub-Assistant Director of Agriculture, who was Acting as Vice-Principal, was retransferred to the Agricultural Department in July 1904. The College had thereafter to work for almost the whole of the year without a Professor of Agriculture: further, there was a change in the other lecturers owing to the illness and subsequent death of the First Assistant. The results of the final examinations, nevertheless, showed an improvement as compared with those of 1903–1904.

The Veterinary Hospital attached to the College continued to be popular and the total number of cases treated showed a slight increase.

An improvement was introdueed into the College farm in the shape of an oil-engine and pump for raising water from the Adyar, and this was of special value as the rainfall during the year under report was very deficient.

The students of the College made two tours of agricultural study—the first in October 1904 in the South Arcot, Tanjore, Madura and Tinnevelly districts and the second in January 1905 in the Cuddapah district.

VII.—THE PUBLICATION OF AGRICULTURAL INFORMATION.

39. A bulletin (No. 50), on sugarcane cultivation in the Deccan districts of the Madras Presidency, was issued during the year under report. The note on the sugarcane cultivation at the Samalkot experimental station which was published in *diglott*, as stated in paragraph 33 of the previous report, was revised with reference to the results attained in 1903–1904, and the revised note was published in the District Gazettes for the benefit of ryots and was also distributed to leading agriculturists. Similarly, a note in English and Tamil on the successful cultivation of the variety of paddy called Banko at the Koilpatti farm and the special merits of its cultivation was printed as a leaflet and distributed among ryots in the Tinnevelly district. Two more leaflets on "Alkali Land and its Reclamation" and "The Bamboo Seed Drill" were translated into Tamil, Telugu and Canarese and copies thereof were

circulated with District Gazettes and distributed among ryots throughout the Presidency exclusive of the West Coast districts. A note on the cultivation of Sisal hemp in Yucatan was printed and copies were supplied to Collectors of selected districts for circulation among those interested in the aloe fibre industry. As directed in paragraph 7 of the Government Order reviewing the report for 1903–1904, a new method of bringing the results attained at the Samalkot farm to the notice of the ryots of the cane-planting villages in the Gódávari district was adopted during the year under report. An agent was furnished with copies of a printed pamphlet as well as with a cartful of samples of the sugarcane grown successfully at the farm; with this twofold equipment he called at the various villages, held public meetings of the ryots, explained to them the contents of the pamphlet, and exhibited his specimens. Another plan was also tried at the farm, viz., to train on the farm, for a few weeks or a month, selected ryots belonging to the several zamindaris and to send them back duly impressed with the general aspect of the different varieties grown on the farm and charged with information as to the improved methods of work there adopted. In Tanjore an Agricultural Inspector was occasionally deputed to help the Tanjore Agricultural and Industrial Institution in the introduction of new crops and of improved methods of agriculture and improved implements and similar assistance was rendered to the Penukonda Agricultural Society in the cultivation of their vineyards.

40. An Industrial Monograph on "Tanning and Working in Leather," the subject prescribed by Government for 1902–1903, was issued during the year. Under the orders of Government, steps were taken to ascertain the number of copies required for free distribution to the various District Agricultural, Planters' and Trades' Associations and to Editors of newspapers and reviews with a view to the monograph being brought to the notice of leather merchants and traders generally throughout the Presidency: arrangements were also made to abridge the monograph for translation into the several vernaculars and publication for the benefit of villagers, tanners and leather workers. The subject chosen for the industrial monograph for the year under report is "Stone-carving and Inlaying", and Mr. A. Rea, Superintendent of Archæological Survey, has undertaken its preparation. It is not, however, due until September 1905.

41. The number of papers received from and communicated to other Provincial departments was as follows:—

	Received.		Sent.
	Indian.	Foreign.	
	NO.	NO.	NO.
Total publications	246	835	18

APPENDIX I.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST, MADRAS.

I have the honour to present the following report of work done in my office during the year 1904–1905.

2. Owing to various causes this work suffered considerable derangement—

(1) The office was transferred during the year to the Drill Hall of the Madras Volunteer Guards. The collections were rearranged and spread out, the new premises were furnished, a laboratory was constructed and the library brought into order.

(2) There was a great extension in the work of the Samalkota sugarcane farm. Land was acquired for a permanent farm and building operations commenced. Two new farms were opened—one at Palur in South Arcot for the study of ground-nut, sugarcane and indigo, and one at Taliparamba in Malabar for the study of pepper.

(3) The ordinary work of the office was further disturbed by the deputation of the Government Botanist to the Pusa Conference and the ensuing heavy work in connection with the development of the Agricultural Department in Madras.

3. An important addition was made to the staff in the shape of fieldmen. This experiment promises to be of the greatest assistance in various directions. There has, however, been considerable difficulty in obtaining suitable candidates, because of the absence of an assurance of future prospects. Only two of the three posts have been filled.

4. The Government Botanist spent 200 days on tour during the year. The tours projected and sanctioned by Government were (1) an economic tour in the Ceded Districts and (2) a systematic survey tour in the Travancore forests. The former was given up in favour of a thorough study of the South Arcot district in connection with the Palur farm and the latter was postponed in favour of a similar study of Malabar pepper plantations in preparation for the Taliparamba farm. Seven visits were made to Samalkota during the year. A visit was paid to Koilpatti to observe the cotton crossing experiments, to Burliyar and Kallar plantations of the Nilgiris and to the Melrosapuram farm. Frequent visits were paid to the Saidapet farm to observe the experiments in ground-nut, indigo, sugarcane and cotton. A short tour was made to Alamuru in the Gódávari district to study the palmyra disease and the deputation to Pusa was made use of for special studies at the Royal Botanic gardens, Calcutta, and the office of the Reporter on Economic Products to the Government of India.

The various Assistants spent about 360 days on tour including visits to Travancore, Mysore, Gódávari, South Arcot, Koilpatti, Ootacamund, Erode, Guntúr, Malabar, Udamalpet, Saidapet, Coimbatore, Tanjore and Salem.

5. The systematic botanical survey of the Presidency has had comparatively little attention paid to it during the year. One Sub-Assistant is set apart for the work of keeping the collections of the Madras flora in order. He has also to make occasional collecting tours. But this officer has during the year been frequently employed on economic work.

A tour was made by him along the Travancore backwaters, partly for the purpose of preparing the way for the Government Botanist, but more especially for making a collection of the indigenous indigos and collecting seeds of *Indigofera longeracemosa* recently rediscovered in that part of South India. Another tour was made along the chief sandal-bearing tracts of Mysore for the formation of an authoritative "Sandal flora". This work was unfortunately rendered difficult by the prevailing drought, few flowers or even leaves being found on the majority of plants. Advantage was taken of this tour to make a collection of the haustoria of the sandal-wood attached to different plants for a comparative study on which the Government Botanist is engaged.

Collections of minor importance were made at various places wherever the Government Botanist was on tour.

6. The herbarium received a considerable amount of attention. The whole of the cases were rearranged and the sheets examined and cleaned upon transference to more commodious quarters, and the regular monthly inspection was rigidly adhered to. About 2,000 sheets were mounted, this number being made up of 1,000 from the Gódávari gorges, 700 from the Wynaad and 300 from the Kistna uplands. Three hundred sheets were mounted for the Calcutta herbarium and about the same number was despatched. In exchange for these, 291 sheets were received from Calcutta.

Only 500 sheets were written on and incorporated in the finished collections, and this fact is worthy of attention. There is a very large collection of mounted specimens in the herbarium not yet written upon. Many of these are already worked out, but there has not been time for the Sub-Assistant or the Government Botanist to put the finishing touch and add them to the collection. During the year 2,000 sheets have been mounted and only 500 have been written upon, the mass of sheets undealt with having thus been increased by 1,500, and this in a year when active collection was in abeyance. The Botanical Survey of the Presidency takes up a very small portion of the time of the staff at present. But, considering the value of the collection and the advisability of keeping pace with Bengal, Bombay and the United Provinces in all of which floras have now been prepared, it should be placed upon a more satisfactory basis.

7. During the intervals of economic work, the Government Botanist devoted some of his time to a biological study of the parasitic phanerogams of the Presidency. These have considerable economic importance. The various species of Loranthus severely injure many of the forest trees and a careful study of their mode of life has been instituted. Considerable collections have been made of all stages of their development from the seed to the mature plant. Observations are much needed by Forest officers as to the special birds which distribute the seeds of the different varieties.

A close study has been undertaken of the sandal haustoria. It is felt that a biological study of this curious parasitic tree is needed in order to prepare the way for successful plantations. Some of the results of this investigation have been published in a couple of papers in the "Indian Forester".

8. Although no great strides have been made in the collection of economic plants during the year (for the reasons stated in paragraph 2), the tendency towards the development of this branch of herbarium work at the expense of the systematic survey has been very marked. The study of plant diseases generally has received a check because of the absence of competent assistants and the necessity of employing the whole staff on general agricultural matters. Practically the whole strength of the office has been thrown into the foundation of the three farms mentioned below.

9. The work of the *sugarcane farm at Samalkota* has been carried on with energy. Great attention has been paid to the collection and study of the different varieties of canes, 30 or 40 of which have now been got together. Large numbers of the Red Mauritius canes were distributed to the ryots at the commencement of the year and the plots on which these were planted were inspected twice during their growth by the Agricultural Inspector. The success of this variety as compared with the local kinds was so marked that the demands for seed were far in excess of the capacity of the farm. The experiments with methods of planting, the application of different kinds of manures, the formation of a weed compost, the raising of seedling canes and the collection of sports have been continued.

Under instructions from the Director of Agriculture, a block of 36 acres has been selected for the formation of a permanent sugarcane farm, the land during the past 3 years having been rented each season, a jaggery shed and store-house has been erected and plans have been prepared for the laying out of the farm, the erection of quarters for the Inspector in charge and an inspection bungalow for European officers.

The farm has received many visitors including the Director of Agriculture, the Deputy Director of Agriculture, the Collector of the district, Dr. Lehmann, the Hon'ble Mr. Yorke, the Rajah of Venkatagiri, three Zamindars of Peddapur, the Manager of Pithápuram Estate, the Cocanada Chamber of Commerce, the District Association and hundreds of ryots, many of whom have travelled great distances. Selected cultivators deputed by various land-owners have been received upon the farm and instructed in the methods of cane cultivation adopted. During the year a set of Barbados seedlings have been successfully introduced and are being grown under observation at the Saidapet farm and the Agri-Horticultural Society's gardens in Madras.

10. Consequent upon the study of the conditions of the pepper plantations commenced last year, it was decided by Government that a special farm should be devoted to the subject. After a considerable amount of touring, it was considered advisable that this farm should be placed in Malabar, the home of the pepper plant, and not in the Wynaad, although a subsidiary farm might be formed there later. A site has been accordingly selected at Taliparamba in the Chirakkal taluk. Although most of the preliminary work has been accomplished, the land had not been acquired at the close of the official year.

11. The importance of the groundnut in South Arcot and the occurrence of a serious disease in this staple in the Poona farm led to a careful study of this crop. Three tours were made by the Government Botanist and several by his Assistants in the South Arcot district and, finally, a site for the farm was selected near Palur in the Cuddalore taluk. Arrangements were made by the inclusion of 5 acres of wet land for the formation of a sugarcane nursery in the south of the Presidency, and a truck-load of the best Samalkota varieties were sent down and planted. A number of indigo varieties had been collected in the Government Botanist's office, as detailed elsewhere in this report, and these have been planted as a rotation crop on the dry land not required for ground-nut. The land for this farm has been rented for two years. It has been enclosed and planted up and an office and cattle-shed have been erected.

12. The following subjects of economic interest have received special attention during the year:—

Grasses.—Seven hundred and eighty-five sheets were mounted during the year, comprising collections from Tinnevelly, the Nilgiris, Madras and the Wynaad. Seventy-one of these sheets refer to diseases. A set of grass-smuts, sent for determination in November 1903, were worked out by Dr. Butler, and, out of the fifteen kinds sent, six were found to be new species, while three have not been finally named.

13. *Lemon-grass.*—Two lots of lemon-grass have been received for the herbarium, one from Mr. Jowitt of Ceylon, who is specially studying the group, and one from Mr. Barton Wright of the Nilgiris. These have been determined as regards the species, but the naming of the varieties has not been possible in the absence of authentic herbarium specimens.

A Wardian case of Cochin lemon-grass was carefully packed and forwarded to Kew for the Imperial Commissioner of Agriculture in the West Indies. The result was a failure, the plants being dead on their arrival in England. A third lot has been obtained from Cochin for another attempt. Seed will also be collected for transmission.

14. *Agaves.*—At the instance of the Superintendent of the Calcutta Botanical Gardens, and of Mr. J. R. Drummond, I.C.S., a thorough survey has been made of the agaves of the Presidency These plants, although widely scattered, are not natives of India, having been introduced at various periods. One hundred and nine lots were received and forwarded to Calcutta. The sending of such large specimens involved a considerable amount of labour and the collection of their vernacular names and uses entailed an active correspondence throughout the year. The results, however, have justified the trouble, for it has been found that the names locally applied are pretty generally incorrect. The economic importance of this cannot be overestimated. Various attempts have been made in South India to start fibre plantations, and, for this, the true determination of the species is of prime importance. For instance, the plant usually called *Agave americana* proves to be *Agave vera-cruz* and the fibre value of these plants is probably very different. A bulletin on the subject is about to be published by the Calcutta authorities and full details will be found in it regarding the Madras varieties.

15. *Sorghums* (*cholum*, *jonna*).—Seventy-one numbers of sorghums were forwarded to the Reporter on Economic Products in continuation of last year's collections. Specimens of all these have been retained in the local office herbarium. A study was made of the Irungu cholums in the Koilpatti farm and these were divided into fifteen varieties, which, it was recommended, should be kept apart. An attempt was made to classify all the sorghums thus far collected and an Assistant went over all the sheets with the Deputy Director of Agriculture. The collection of sorghums in the office is now large and fairly representative. It includes 680 sheets of sorghum heads and 70 sheets of diseased specimens, filling six large herbarium cases.

16. *Yams, etc.*—The survey of the wild yams of the Presidency has been continued and 51 sets of leaves and tubers have been forwarded to the Reporter on Economic Products for further growth and determination. Besides these, various packages of paddy, kudiraivali (*Panicum frumentaceum*, *Roxb.*), varagu, cumbu, tenai, pepper, chillies and so forth were also forwarded for experimental growth at Sibpur, duplicates being retained in the office collection.

17. *Indigo.*—Indigo seed has been collected from various sources for growth on the Palur farm. An Assistant was sent to Travancore to obtain seed of *Indigofera longeracemosa*. He succeeded in finding a number of plants, the seed of which was selected and has been planted at Palur, Saidapet, Pusa, Calcutta and Java. Seed of *Indigofera anil*, discovered only in the Satyamanglam taluk of the Coimbatore district, has also been sown, but *Indigofera articulata*, found in the Palnad taluk of the Kistna district, was not obtainable because of the failure of the north-east monsoon. *Delhi indigo* was obtained from Colonel Prain. *Indigofera arrecta* was received from Mr. Coventry at Pusa, while the *Cocanada*, *Tanjore* and *Nandyal* varieties have been obtained from various parts and have been planted in the series.

18. *Cotton.*—The investigation of cotton problems has been relegated to the office of the Deputy Director of Agriculture. A certain amount of attention was, however, devoted to the subject. A large collection of the *tree-cottons* from all parts of the Presidency was grown on the Saidapet farm for the Inspector-General of Agriculture, and herbarium specimens of these were collected during the year. Similarly, eighteen varieties of *American cottons*, considered suitable for cultivation on light soil with irrigation, were obtained from the Koilpatti farm and grown at Saidapet. Herbarium specimens have been taken of these. A couple of plots of light-soil cotton, the *Yerrapatty* of Kurnool and the *Bourboun* of Erode were also grown at Saidapet under the Government Botanist's directions. Three minor experiments in cotton-growing were tried in the Salem, Tanjore and Coimbatore Jails, an attempt being made to determine the nature of the plants grown from bazaar seed in each case. Owing to unfavourable nature of the weather, all of these plots which were inspected several times during the year, have failed.

19. *Castor.*—At the instance of the Ceylon Agricultural Department, a small collection of the different varieties of castor was made and the following were transmitted:—*Pedda* and *Chitta amudam* from Bezwada, *Periya* and *Chitta amanakku* from Coimbatore, *Payira amudam* from Guntúr, *Tota amudam* from Hindupur and *Shenkottai* from Erode. The results of sowing these different varieties in the Ceylon agricultural farm will be followed with interest and should be of use to Madras.

20. A great amount of miscellaneous work has been accomplished by the office during the year and the correspondence has been large. Attention has already been drawn to the absence of the skilled assistants in the investigation of plant diseases. Considerable numbers of specimens have, however, been obtained during the year and have received as careful attention as was possible under the circumstances. No large additions have been made to the collection of Madras plant-pests. The Cryptogamic Botanist to the Government of India, besides naming our grass-smuts, has forwarded a useful herbarium set of sugarcane diseases in North India and has helped us in various other ways. Both he and the Inspector-General of Agriculture have visited Madras during the year to the great benefit of the Department. Upon removal of the office to more commodious quarters, the collection of photographic negatives has been got into order and now numbers between 300 and 400. Work in this direction has, however, been hampered by an injury in the Government Botanist's fingers and the absence of any one else in the office capable of doing the work. A photographic subordinate is badly needed. The office has sustained a severe loss in the death of the artist Govindarajulu who showed great talent and whose place it will be difficult to fill.

(Signed) C. A. Barber,
Government Botanist, Madras.

Madras,
12th June 1905.

APPENDIX II.

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT, MADRAS.

I have the honour to report as follows on the work done during the official year 1904–1905.

2. I was in charge of both the Civil Veterinary Department and the Madras Veterinary College during the year. The staff of the College consisted of an Assistant Principal, Mr. D'Silva, and Senior lecturer Mr. Mascarenhas, whose services were lent to the Conservator of Forests, Southern Circle, for one year from the 4th March 1905. In his place, Mr. Valladares was appointed. In January 1905 another lecturer was added to this staff.

3. I was on tour for 86 days during the year and travelled 8,929 miles by rail and 437 miles by road. My presence at head-quarters, for a longer period, was necessary in connection with the supervision of the College work. When everything is in working order and the full complement number of assistants, *i.e.*, four, are entertained, I may be able to spare more of my time to inspection duty. The principal portion of my tour was in the pony-breeding districts and in the districts where inoculation was in progress. In connection with the inoculation, I had been to Tanjore, Berhampur, Vizagapatam, Pithápuram, Bápatla and Ongole taluks. The progress of inoculation work and its usefulness are referred to in subsequent paragraphs. The hospitals at Trichinopoly, Madura—where one has been started during the latter part of October 1904—and Pithápuram were visited by me frequently. Cuddalore, Berhampur, Coonoor and Rájahmundry were also inspected by me to ascertain the importance of these centres for starting similar institutions. It is anticipated that in Rajahmundry, Coonoor and Berhampur hospitals will soon be started, and I am of opinion that they will be very popular. Cuddalore is a suitable centre, but the opening of a hospital should be deferred until the scheme about Veterinary hospitals has been decided, and more Veterinary graduates are available. Several other places which are supposed to be important centres of cattle breeding or at least susceptible of improvement in this direction were visited, and a report on the furtherance of a scheme for the improvement of the cattle of this Presidency was submitted by me during the year. On information that glanders was suspected among the horses at Coonoor, I proceeded to the spot and inspected some of the dawk lines and satisfied myself that the disease was the less dangerous one of strangles. In addition to the above, the Government elephants at Pollachi were inspected under direction of the Board of Revenue. I was also directed to inspect the different taluks of the Nellore district, in connection with certain forest restrictions which were said to interfere with the good grazing of the cattle of Nellore, and at the same time discouraged the ryot from interesting himself in cattle breeding which is a speciality in most of the places of Nellore district.

4. *Madras Veterinary College.*—(i) The new buildings have been completed and the classes will be held there from the next term commencing from 1st July 1905. During the year, Dobbin Hall was acquired by Government, and this has been proposed to be altered into a hostel for students. Four kitchen houses have also been provided. The Society for the Prevention of Cruelty to Animals has erected a new Dog's home by the side of their main buildings, and has allotted a ward for dogs, also a spacious hall for conducting operations. This will afford the students considerable experience in canine practice.

(ii) The year commenced with 20 students in class A and all of them secured promotion to class B. The examination in all branches was conducted by me personally. The students have done well both in practical and theoretical work, and 11 of them secured more than 80 per cent. of full marks and the last student 75 per cent. Again a fresh batch of 20 students was admitted in October 1904, and their term commenced from 1st January 1905. These students were examined at the end of December for the distribution of the stipends and at the end of March again. I have adopted the plan of having a preliminary course for students on first entering the College. It can then be seen whether the young men show aptitude for the work. If they work satisfactorily they are allowed to continue their course.

(iii) The working hours are at present between 7 and 10 in the mornings and 2 and 4 in the afternoon. These hours are convenient inasmuch as they suit the public who call at the hospital only during the morning hours, and it is during these hours that most of the practical work is done. The hospital is open for urgent cases at all hours, and the Assistant Principal, who resides in the premises, attends to these. All the Assistants are in attendance at the hospital during the morning hours, each in charge of a ward.

(iv) The attendance of students of both the classes has been very regular and they have all worked diligently. During the year one student, Krishna Kamalathara Rao, was, as a special case, exempted by Government from the operation of the rule that only passed candidates are to be admitted for the course.

(v) The Museum and the Library were further equipped during the year. Valuable models of a horse, cow and other portions of anatomy were obtained from the Secretary of State for instruction of students.

(vi) Lucerne was cultivated in the compound of the College and it grew well. This was supplied to sick cases in the hospital every day and as a diet it was of great medicinal value. Guinea grass was continued to be grown and this was likewise supplied to sick cases. It is proposed to apportion a plot for the cultivation of Harialli grass and it is expected that it will do well and thus be a saving in the feeding.

(vii) Evening exercises for students were made compulsory and the attendance was regular. They played a few cricket matches with the other Colleges and in most of them they came out successful. This year, a foot ball team, and a badminton club will be added, as the number of students, when the other class is formed, is bound to increase. The students celebrated the College day in the month of October, and the proceedings thereof were conducted with great enthusiasm. Such gatherings tend to promote *esprit de corps* among students and I therefore trust it will become an annual institution. Mr. D'Silva has performed his duties to my satisfaction and I beg to record herein my appreciation of his valuable services. The work of the Veterinary hospital, attached to the College, is referred to separately.

5. *Cattle disease.*—(i) Appendices F and G are appended to the report and numbered XV and XVI respectively as ordered by the Board of Revenue.

(ii) The total deaths among cattle during the official year in the Madras Presidency was 89,871 from diseases and 14,370 from other causes, thus making up a total of 104,241 which is less than 1 per cent. of the total stock. The total loss during the year is very much the same as in the previous year, the difference being very slight. More than a third of the loss is attributed to unspecified diseases. The figures against rinderpest show an increase, and that against epizootic aptha a decline. Almost all the districts, especially Gódávari and Kistna, suffered an increased mortality from rinderpest. The loss from anthrax was very much less during the year in the districts of Gódávari, Nellore, Chingleput and Tanjore. In all these districts preventive inoculation against anthrax was in progress. When compared to the figures of the past year the mortality was reduced by nearly 50 per cent. in the Nellore district. This would go towards proving the beneficial results of inoculation against anthrax. In Ganjám, however, the figures show an increase in the mortality from this cause. Very careful antiseptic precautions were used in the administration of the sera, consequently no untoward results were reported. Tables II and XVI.

Further, the sera have to be preserved at a somewhat low temperature, which causes anxiety during the hot weather; therefore I have devised a plan whereby the serum bottles are preserved in ice boxes and despatched only in small quantities to the Veterinary Assistants whenever they apply for the serum. As the period of immunity lasts probably for six months, inoculation has to be repeated in cases of continued outbreaks.

(iii) During the past three years preventive inoculation has become very popular, and this department is frequently being requested to inoculate herds of cattle. The following figures will very clearly show the degree of popularity which preventive inoculation has attained, and which is to my mind entirely satisfactory. The satisfactory result is due to the tact of the Veterinary Assistants employed on this work and also to the beneficial results which have accrued:— Table III.

——	Anthrax.	Rinderpest.	Total.
1902-1903	377	..	377
1903-1904	6,329	2,805	9,134
1904-1905	12,437	8,251	20,688

In many cases where an animal actually had the disease—rinderpest—a dose of 50 c.c. proved effective and saved the animal. Malignant sore-throat was somewhat noticeable in the Ganjám, Kistna, Nellore and South Arcot districts, and black quarter in Cuddapah and Kurnool. Under epizootic aptha there had been nothing noticeable. I am not inclined to believe that 2,767 deaths can be caused by this disease. Epizootic aptha seldom ends in death. The average loss from the diseases malignant sore-throat, black quarter and epizootic aptha does not show any appreciable decrease over that of the previous year.

(iv) Cattle mortality was most severe in the Ganjám and the Gódávari districts, and the Ceded districts come next. These two portions of the Presidency, the Circars and the Ceded districts, afford a vast field for the operations of this department.

(v) It must however be remembered that during certain portions of the year large herds of cattle are brought from the surrounding and indeed distant districts for grazing, so that disease is constantly being imported into the district, and which it is almost impossible to prevent. The only measure then to be adopted is to have a larger staff in these districts, and reports of cattle disease to be sent direct to the Veterinary Assistants. These officials would at once proceed to the locality and inoculate all the animals comprising the herd. In this way the spread of the disease might be stopped.

(vi) According to the figures, the loss from other causes has been increasing, especially under "wild animals".

(vii) Under equines there had been 299 deaths from disease and 87 from accidents. Bellary district reported the largest number of deaths (40). During the year there were no contagious diseases, such as glanders and farcy among horses, reported.

6. *Veterinary Hospitals.*—(i) There are now five hospitals in this Presidency. One is attached to the Veterinary College, Vepery, one to the Agricultural College, Saidapet. Two are under the District Boards of Trichinopoly and Madura. One is in Pithápuram under the Court of Wards. The one in Madura was opened only in October 1904 and for some time afterwards, it was without a Veterinary Assistant, as the one appointed, Mr. Shah, left his duties abruptly. Table V.

(ii) The subjoined statement should speak for the progress attained by each of these hospitals :—

Serial number.	Name of the hospital.	In-patients.				Total number of in-patients.	Out-patients.				Total number of out-patients.	Total number of in and out patients.	Total number of in and out patients during last year.
		Horses.	Cattle.	Dogs.	Others.		Horses.	Cattle.	Dogs.	Others.			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Veterinary College Hospital	434	131	351	13	929	265	52	708	27	1,052	1,981	778
2	Saidapet Veterinary Hospital	* 386	* 489	..	* 357	..	...	..	..	..	..	1,232	1,218
3	Trichinopoly Veterinary Hospital ..	238	344	121	..	703	..	..	..	..	..	703	..
4	Madura Veterinary Hospital	146	229	30	..	405	..	..	..	..	..	405	..
5	Pithápuram Veterinary Hospital ..	9	6	3	..	18	35	817	90	13	955	973	639

* Refers to both in and out-patients.

(iii) In Trichinopoly and Madura it is the custom that fresh numbers are given to cases as they are daily admitted. The average number of cases treated every day amounted to 33 in Trichinopoly and 15 in Madura. From the figures, it is evident that Trichinopoly hospital has been growing in popularity and the hospital in Madura shows signs of becoming as useful as the one in the Trichinopoly district. The locality of the Madura dispensary, however, leaves much to be desired as it is a long way from the city. I hope shortly to have it removed to a more central place where it should become very popular.

(iv) Pithápuram is more a place for cattle and the number of bovine patients treated is 823 as against 581 for nine months during the previous year. The figures show a satisfactory increase. The Veterinary Assistant is a Punjabi and a graduate of that College, but he has very many difficulties to contend with. My experience still bears me out in the opinion that in order to get successful work done, only co-religionists with a good knowledge of the local vernacular may be employed, and who can hope to obtain the confidence of cattle owners who are extremely conservative. This difficulty will be met when the graduates of the Madras Veterinary College are forthcoming. Though the number of bovine cases treated at this hospital showed a small number of in-patients, it should in no way be considered that the hospital has gone down in popularity. The number of out-patients has increased. The fact is that the people cannot spare the time and trouble to look after their own animals while in hospital. If the animals were tended and fed at the dispensary, no doubt the animals would be allowed to remain. Except in serious illness, however, it seems desirable that the patients should be taken home where they receive every care from the owner's family. The Veterinary Assistant was, in addition to his hospital duties, employed on inoculation work outside Pithápuram on two different occasions, and this might have affected, to some degree, the hospital practice.

In Saidapet the number of patients treated has steadily increased year after year, from about 200 cases in 1888–89 to 1,232 during the year under report. I understand from a report received from Mr. Kees that certain proposals have been submitted to improve the cattle practice. I believe it is contemplated to supply feed for the cases while at the hospital, without trouble to owners who in most cases do not happen to live near to look after the cases themselves.

(v) Then coming to the hospital in Madras, it may be seen that the total number of patients was 1,981 during the year as against 778 for the six months in 1903–1904. The number of cattle patients was 183 against 77 during the previous year. The cattle practice has been increasing daily and to-day there are 36 patients under treatment in the hospital. Equine and canine practice form a large portion of the practice here, and the number of patients under these heads has increased from 687 during the latter half of the previous year to 1,758 during the current year. The nature of the cases treated at the hospital falls under different headings and affords ample opportunities for the instruction of students. On the whole, during the year, there had been only five cases among horses and two in dogs that were returned as incurable. There were 114 deaths among the patients treated during the year—and they are made up of horses 14, cattle 16, dogs 82, and others 2; and 35 cases were destroyed at the request of owners which number has not been included under the total number of cases treated. The destruction of animals has been undertaken by the hospital, as the bodies afford material for instruction to students in dissection and *post-mortem* examinations. In the hospital 329 major and 124 minor operations were conducted during the year. The number of police cases treated at the hospital are comparatively few and the main practice is among private cases. I consider that the menial establishment of the hospital is very much undermanned and propositions for a further increase will be submitted. The total receipts in the Veterinary hospital during the year amounted to Rs. 6,364-12-1.

Table XI.

7. *Pony-breeding operations.*—(i) During the year the number of stallions at work was only fourteen, as the one lent to the Raja of Tuni died from colic. There were eight in Coimbatore,

four in Salem, one in Madura and one in Trichinopoly, but latterly at Ootacamund in charge of a private gentleman, Mr. Morey. Mr. Morey has lately died, and the stallion has been removed to Kangayam until such time as a Veterinary dispensary has been established in Ootacamund when the stallion would be located there—a most convenient place for his work. The other stallions were under departmental supervision. The Pattaigar of Pallaikotta and the Mittadar of Pagalpatti both returned the stallions in their charge. From the latter I was obliged to withdraw it, as he did not maintain one of the conditions of the agreement that the stalls should be of the design approved by the Superintendent of the Civil Veterinary Department. The former was withdrawn on account of the prevalence of strangles among the Pattaigar's horses. I did not try during the year under report to influence any of the private owners to take charge of the stallions. I consider that it is not desirable to station stallions in places which are far away from Veterinary aid and where constant supervision by Veterinary Assistants cannot be arranged without some sacrifice to their other duties. There are, of course, a few other centres in this Presidency where pony breeding might do some good, and in such places the stallions should be stationed in the compound of the Veterinary Hospitals (when these are started) so that proper supervision might always be exercised. I had been round Coimbatore, Salem and Madura districts and visited almost all the places where stallions had been located. In these districts, the stallions are looked after by the District officers who have evinced much interest in them. The total number of coverings was 356 for 14 stallions or more accurately 13 stallions, as Stallion Rahiman covered only four mares during the year and for the most part of the year was at Madras under treatment, as he was falling off in condition. The average number of coverings would therefore be, eliminating Rahiman, 27 per stallion as against 28 during last year.

(ii) *Coimbatore.*—Eight stallions were at work in this district. Stallions Abdulla, Hector, Baby and Punch continued to work at their respective centres throughout the year. Stallion "Nile" was working at Dhárápuram till 10th June 1904 when he was transferred to Bhaváni where he worked till about the middle of October and he was afterwards transferred to Kangayam where he has been working ever since. "Ophir" was in charge of Pattaigar of Pallaikotta until the end of June when he was transferred to Kangayam. "Jumna" worked at Erode till the middle of September when he was transferred to Perundurai on account of plague at the former station. "Ali" worked at Karúr for six months and afterwards at Udumalpet. Thus at the end of the year out of eight stallions four were stationed at Kangayam, Dhárápuram taluk. This is the chief breeding centre in the district. In the Coimbatore district the total number of mares served was 219 for 8 stallions against 271 for 9 stallions in the previous year. Thus the average per stallion was 27 during the year, which is very nearly the same as that of the previous year. Only one stallion, "Baby", covered 40 mares, two others, Punch and Ophir, 32 and 31, respectively, and the others below 30. The work of "Nile" was poor and this is owing to prevalence of plague at Dhárápuram and paucity of mares at Bhaváni where he was afterwards transferred. At Kangayam, however, he was not much in favour with the ryots as there were three other stallions at stud, at that place, which were more appreciated as good stock-getters, especially "Abdulla." During this year also, Kollegal, one of the important centres for breeding, was without a stallion, as it was considered premature to renew operations at this place.

(iii) *Salem.*—There were four stallions in this district, three in the Hosúr sub-division and one in Salem for about 14 days, and afterwards at Hosúr. In the Hosúr sub-division "Sunshine" and "Tigris" were at Dharmapuri for seven months and one month respectively and afterwards they were transferred to Pennagaram and Krishnagiri where they continued to work until the end of the year. "Selim" stood at Hosúr during the whole year. The Sub-Collector, Salem, reports that at Krishnagiri the services of "Tigris" were much in demand. He is a fine specimen of an high caste Arab and he covered the largest number of mares, viz., 46. The total number of coverings in the Salem district was 114 which exceeded that of the previous year by one. The average per stallion during the year was 28·5 against 22·6 which was the average for the previous year.

(iv) *Madura.*—"Samawy" was stationed in Madura district, nine months in Dindigul and three months in Palni. He covered 19 mares in all or 5 less than in the previous year. He has been now transferred to a new centre in the Madura district

(v) *Trichinopoly* and *Ootacamund.*—"Rahiman" was withdrawn from Trichinopoly as he required some rest and after keeping him in Madras for three months I sent him to Ootacamund to Mr. Morey where he covered four mares. It is believed that the pony covered several others, but which have not been reported.

(vi) Pony-breeding operations, as far as can be judged by the results and the prices demanded for the stock of Government stallions, do not call for adverse criticism. The Sub-Collector of Hosúr remarks as follows: "I am of opinion that the success of pony-breeding operations depends in some measure on the interest taken by the Divisional Officer. Government stallions have become such an institution in Hosúr that I trust they will not be abolished without good reason. Many mares come for service with their foals and the progeny of their sires, especially of "Tigris", are of good quality. Some mittadars have produced some very fair ponies in this way." Though the number of coverings on the whole show a decrease over the figures of the previous year, it cannot be doubted that pony-breeding, as an industry, might well be preserved in this Presidency. It would not require any great effort just now, until the results, at the end of the stipulated period—*vide* G.O., No. 421, Revenue, dated 24th April 1903—show satisfactory progress and justify further stimulus. No compulsion had been used and no influence was brought to bear on the ryots requiring them to avail of the services of these stallions but, as in previous year, the system that the ryots should voluntarily take their mares to these stallions was followed.

(vii) The subjoined table shows the work done by each stallion for the last three years: —

Number of stallion.	Name of the stallion.	1902-1903.	1903-1904.	1904-1905.
6	Abdulla	31	30	24
7	Carbon	32	20	14
11	Parel	28	20	..
13	Sunshine	29	30	25
15	Selim	30	18	29
17	Hector	40	33	25
18	Baby	19	33	40
19	Nile	28	16	14
20	Tigris	40	29	46
22	Ophir	48	32	31
23	Jumna	27	30	24
24	Ali	..	41	29
25	Rahiman	..	31	4
26	Punch	..	39	32
27	Samawy	..	24	19

8. *Results of the coverings of the official year* 1903–1904.—There had been 426 coverings; of these in 359 cases enquiries were made and in the remaining 67 cases the reports are still due. Of the ascertained cases 110 were successful cases including 6 that had aborted. One hundred and eighty-three cases proved empty and the remaining 66 cases were not traceable, for they were sold subsequently and removed to other parts of the Presidency. This gives a percentage of 37·5 successful coverings, omitting out of account cases that were not reported and not traceable. This must be considered as an extremely favourable result when compared to the percentage 27·8 during 1902–1903. The results of these operations, for the most part, depend upon the time of service and the care bestowed on the animals after the service, setting aside other peculiarities of minor importance. As the results of the coverings improve, more mares of a better quality will be brought to the sires and on these grounds, I would advise Government to continue the pony-breeding operations. The non-compulsory system, that is, the system whereby owners of mares may voluntarily bring their animals to be covered without being worried by Chuprasis and Inspectors has, I maintain, proved satisfactory and may be adhered to. An award of Rs. 25 was given to a mule foal in December 1904 on the recommendation of the Collector.

9. *Castration.*—As in previous year, two salustries were at work in the Coimbatore district and 63 pony entires were castrated as against 74 in 1903–1904. Of the number castrated, two ponies died a few days after castration from tetanus and a compensation of Rs. 45 was sanctioned by the Board to the owners of the ponies (Rs. 25 in one case and Rs. 20 in the other). In the Salem district only one salustry was employed and he castrated 16 entires, one less than in the previous year. Each of them was on privilege leave for some time. It has been found somewhat difficult to obtain work for these men in the centres where they were previously employed and consequently they had been now and again transferred from one centre to another in search of work. Although these salustries do not belong to the permanent establishment, their services should be continued until the subordinate staff of the Civil Veterinary Department has been entertained, and duties such as castration can be taken up by them. The salustries also look after the Government stallions.

Table XIV.

10. *Cattle fairs and shows.*—I had notice of cattle fairs held in Tinnevelly district only. Veterinary Assistants were deputed only to a few of the important fairs where the Act was enforced, as they had the more important duty of inoculation to perform. Besides these cattle fairs, cattle shows were held in the Vizianagram and Ongole taluks, both of which I attended, and the reports thereof were submitted to the Board in due course. The other show was in connection with the annual Chingleput Conference at Conjeeveram and Senior Veterinary Assistant M.R.Ry. V. P. Subrahmania Mudaliar attended this show. It is needless to dilate upon the usefulness of these shows, as full reports have already been submitted by me; but I trust that many more will be held in conjunction with the several important Agricultural Associations which have been recently organised.

Regarding cattle breeding nothing has been done during the year, as the proposals, to purchase bulls for distribution among herds, have not received the sanction of Government yet.

Table VII.

11. *Veterinary Assistants.*—(i) During the year the staff consisted of six Veterinary Assistants, three of whom were entertained very late in the year to cope with the demands for inoculation of cattle. One of the Senior Veterinary Assistants, H. C. Sampathu Iyengar, was appointed lecturer in the Veterinary College in January 1905, and in his place, one of the Bombay graduates was entertained temporarily for 2½ years.

(ii) Senior Veterinary Assistant V. P. Subrahmania Mudaliar did duty in seven districts and his work for the most part was inoculation. He has been able to inoculate 11,057 cattle on the whole for rinderpest and anthrax. He investigated an outbreak of charbon symptamatic in Anantapur district. In Sáttúr taluk of the Tinnevelly district there was a highly fatal outbreak of rinderpest among sheep and goats in the month of February 1905 and prompt measures were taken to check its spread and about 209 animals were inoculated. In Trichendur, of the

Tinnevelly district, his services were requested for the cattle fair duty and his services were also lent to the Chingleput district show held at Conjeeveram. He has been on privilege leave for 2½ months. His work has been entirely satisfactory.

(iii) M. Hassen Aly Sahib was on cattle fair duty in the Tinnevelly district and attended the marginally-noted cattle fairs where the Act was enforced. There was nothing very important about these fairs and they are usually organised for sale of cattle. The reports go to show that these fairs have been generally successful as markets for the sale of cattle and very good prices have been realised. The Veterinary Assistants are deputed to these fairs to segregate sick cattle, if any, among those that are brought to these fairs and to otherwise deal with them as required under the Act. Many sick cattle were segregated and treated. The arrangements in the cattle fair grounds were defective in some respects, and it is now under proposal to select suitable sites and to draw a model plan that might be adopted at all the fairs. Large sums are collected at these fairs from cattle owners for cattle and for carts that are admitted into the enclosures; and when the necessary improvements are made for the convenience of these cattle dealers it is possible to realise a much larger income. At the invitation of the Secretary to the Zamindar of Ettiyapuram, he was deputed to advise the estate regarding the improvement of breeding operations, and two bulls of the Amrut Mahal and the Nellore types were selected and forwarded to the zamindar. He travelled through nine districts during the year, and besides inoculating 2,799 cattle for rinderpest and anthrax, investigated outbreaks of black quarter and malignant sore-throat in the districts of Madura, Coimbatore, Salem and Guntúr. In Coimbatore strangles prevailed among horses, principally of those of the Pattaigar of Pallaikottai, and necessary advice was given to treat the cases. He performed his services to my satisfaction.

Kalugumalai.	Alwartirunagari.
Sivalaperi.	Muthulapuram.
Kannicherry.	

(iv) Sampathu Iyengar was in charge of the Ganjám and the Gódávari districts. He was occasionally deputed to Vizagapatam. He was principally concerned with inoculation of cattle. Two thousand six hundred and sixty-eight cattle were inoculated by him on the whole, and from January 1905, he has been transferred to the College work. While the elephants of the Agency of Parlákimedi and Chatrapur were ill, professional aid was applied for and he was at once directed to attend to those cases.

(v) Three additional Assistants were employed, two of whom joined in the beginning of January 1905 and one in December 1904. They were trained under one or other of the Senior Veterinary Assistants in practical inoculation work before they were independently placed to perform the work of inoculation. After they were trained it was possible to depute two Assistants in independent charge of Ganjám and Gódávari districts, one for each district. The third man was intended for charge of the proposed Veterinary Hospital at Rajahmundry. The opening of the hospital has been delayed for want of a suitable site. He has been posted to the Trichinopoly hospital while the permanent incumbent was on privilege leave, at the request of the President, District Board, Trichinopoly. The Veterinary Assistant who has been appointed temporarily in place of Sampathu Iyengar was employed in the Tinnevelly and the Tanjore districts. These Veterinary Assistants were principally engaged on inoculation work and they inoculated 3,605 cattle in all, besides 350 sheep in the Tinnevelly district for rinderpest. All the four Assistants are graduates of the Bombay Veterinary College and they have to acquire a further knowledge of the places and the people in order to be more useful as inoculators.

12. *Preventive inoculation.—Table* III which is appended to this report gives details of the inoculation work carried on during the year. On the whole 20,688 animals were inoculated, 8,251 for rinderpest, 12,437 for anthrax, as against 9,134 cattle during the previous year. The noticeable feature in this branch of the work of this department is the steady increase in the number of cattle that were inoculated and the fact that people seem to appreciate the value of this treatment gradually. The reports from Gódávari point out that the ryots have voluntarily submitted the cattle for inoculation. In the previous year it was not without much entreaty and advice that they could be persuaded. In the Ganjám district 46 villages forwarded the outbreak returns regularly. During the year most of the districts applied for the services of Veterinary Assistants but owing to the insufficiency of the staff it was not possible to render help in all cases. Only important outbreaks of diseases were taken notice of. Many of the places, where cattle have been inoculated, were visited again by the Veterinary Assistants with an interval of five months and it was found out that the inoculated cattle, with a very few exceptions, had survived the disease and were more healthy than before. The reports from the taluks where inoculation was in progress, tend to show that the mortality among the inoculated cattle was practically *nil*. The cattle that were actually suffering from disease received a larger dose of the serum and nearly 80 per cent. of these recovered. The results of the inoculation of the past two years have placed the new treatment beyond its experimental stage, and we may now confidently hope to minimise cattle mortality to a considerable extent when the subordinate staff has been properly equipped. Specimens of blood of cases of malignant sore throat, were forwarded to the Imperial Bacteriologist in one or two instances for the preparation of separate serum for this disease, and also to the King's Institute for the preparation of slides for microscopical instruction to students. Table III.

From the Imperial Bacteriologist 13,370 and 13,060 doses of anthrax and rinderpest sera respectively were received during the year.

13. *Expenditure of the Department.*—The total expenditure during the year under report was Rs. 55,237–14–11—Imperial Rs. 17,775, Provincial Rs. 37,462-14-11. The latter amount Table XIV-A.

includes the charges of the Civil Veterinary Department Rs. 11,525-14-11, pony breeding Rs. 4,722-3-9 and Veterinary College and Hospital, Rs. 21,214-12-3. The expenses under Veterinary College and Hospital include the pay of the staff, the stipends for students, and the cost of establishment which alone amount to Rs. 7,090-4-4, and College contingencies Rs. 14,124-7-11. Out of the College contingencies Rs. 6,943-5-10 were spent on furniture, instruments, veterinary models, and some other items which do not come under recurring expenditure. Thus the actual expenditure for medicines and upkeep of the hospital and sports, clubs, etc., amounted to Rs. 7,181-2-1. The total receipts during the year was Rs. 6,364-12-1 and Rs. 769-2-9 was outstanding at the end of 31st March 1905. From this it may be seen that the receipts in the hospital for treatment and feeding have exceeded the outlay. The rates prescribed for the treatment and feeding of the cases are very moderate and the public are generally satisfied with the charges made in the hospital.

14. The Board's Proceedings, communicating that the revised statements should be substituted for those that were hitherto submitted with the annual report, was received on the 23rd March 1905 in this office. There was not, therefore, sufficient time to collect and arrange the information under the headings prescribed in some of the revised statements. The statements contain the information that was available at the time of the preparation of the report.

MADRAS,
29th June 1905.

(Signed) W. D. GUNN,
Superintendent, Civil Veterinary Department.

APPENDICES.

TABLE I.—Showing the main results of the Veterinary College during 1904-1905.

Veterinary Colleges and Schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year, classed by educational qualifications.		
		Admitted during the year.		Passed final examination during the year.	Failed to pass final examination.	Remaining under instruction at end of year.				
		Scholarship-holders.	Paying students.			In ordinary course.	Instruction prolonged by reason of failure to pass.	Matriculated with higher qualifications.	Knowing some English, but not matriculated.	Knowing no English or very little English.
1	2	3	4	5	6	7	8	9	10	11
		NO.							NO.	
Madras	Veterinary Graduate course.	25	..	..	..	..	..	2 F.As. and 35 Matriculates.	3	..

Veterinary Colleges and Schools.	Receipts.			Expenditure.			Employment of students who passed out during the three years preceding.				
	From fees.	From other sources.	Total.	Salaries of instructing staff.	Other expenses.	Total.	Total number passed.	In service of Government or Local Bodies.	In service of other bodies or institutions.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
				RS. A. P.		RS. A. P.					
Madras	..	..	..	4,636 1 11	..	4,636 1 11	..	..	..	..	..

REMARKS.—The College was organised only in January 1904.

TABLE II.—Showing number of deaths from contagious diseases amongst animals during the year 1904–1905.

Province.	Equines.						Bovines.						
	Glanders.	Anthrax.	Surra.	Dourine.	Other diseases.	Total.	Rinderpest.	Foot and mouth disease.	Hæmarrhagic septicæmia.	Black quarter.	Anthrax.	Other contagious diseases.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13	14 †
Madras	..	* 36	..	..	263	299	19,772	2,767	..	7,683	14,996	44,653	89,871

* There are no means of verifying this.

† Columns 15 to 20 of the form prescribed by the Government of India have been omitted as the entry therein is *Nil.*

TABLE III.—Showing results of preventive inoculation during the year 1904–1905.

Province.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
Madras	Rinderpest and Anthrax.	Serum alone method.	:	299	89,871	:	:	20,688	:	:	118	:

TABLE IV.—Showing the number of animals treated and castrated by Veterinary Assistants on tour during 1904–1905—*Nil.**

* The chief work of Veterinary Assistants was inoculation.

TABLE V.—Showing number of animals treated at Veterinary hospitals and dispensaries during the year 1904–1905.

Province.	Number of Veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients.											
			Remaining on 1st April.			Admitted during the year.			Total.			Discharged during the year.		
			Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.
1	2	3	4	5	6	7	8.	9	10	11	12	13	14	15
Madras.														
Veterinary College hospital.	1	3	..	..	..	434	131	364	..	..	..	..	..	..
Saidapet hospital	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Trichinopoly hospital ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Madura hospital	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Pithapuram hospital ..	1	1	..	..	..	9	6	3	..	..	..	..	..	..
Total ..	5	7	..	..	..	443	137	367	..	..	..	..	..	..

Province.	In-patients—*cont.*			Out-patients.						Total number of in and out-patients treated during the year.				Receipts.	Expenditure.	
	Balance on 31st March.			Number treated during the year.			Average daily attendance.									
	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Total.			
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Madras.																
Veterinary College hospital.	..	..	..	265	52	735	..	..	..	699	183	1,099	1,981	..		
Saidapet hospital	..	..	..	..	..	..	..	..	..	386	489	357	1,232	..	Separate register not maintained.	
Trichinopoly hospital ..	..	..	..	..	..	..	..	..	..	238	344	121	703	..	Average number of daily patients 33.	
Madura hospital	..	..	..	..	..	..	..	..	..	146	229	30	405	..	Opened in Oct. 1904, 5 months' average daily cases 15.	
Pithapuram hospital ..	..	..	..	35	817	103	..	..	..	44	823	106	973	..		
Total ..	..	..	..	300	869	838	..	..	..	1,513	2,068	1,713	5,294	..		

Note.—Information on other headings is not available.

TABLE VI.—Abstract showing receipts and expenditure of Veterinary dispensaries during 1904–1905.

Province.	Receipts.						
	Last year's balance.	By Local Fund grants.	By Government grants.	By Municipal contribution.	By fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
Madras.					RS. A. P.	RS. A. P.	RS. A. P.
Saidapet hospital	..	..	..	..	982 3 3	142 11 6	1,124 14 9
Madura hospital	..	..	..	..	..	..	..
Trichinopoly hospital	..	..	..	..	..	..	505 0 0
Veterinary College hospital ..	..	..	..	..	6,364 12 1 *769 2 9	..	6,364 12 1
Total ..	..	..	..	..	8,116 2 1	142 11 6	7,994 10 10

Province.	Expenditure.						Balance.
	Pay.	Travelling allowance.	Medicines, instruments, etc.	Furniture, etc.	Contingencies.	Total.	
	9	10	11	12	13	14	15
Madras.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
Saidapet hospital	855 0 0	..	499 0 0	..	685 0 0	2,039 0 0	..
Madura hospital	376 11 1	108 6 0	223 7 0	..	29 6 0	737 14 1	..
Trichinopoly hospital	..	..	..	..	..	2,018 0 0	..
Veterinary College hospital ..	817 0 0	..	2,595 13 9	853 10 0	6,098 4 3	10,364 12 0	..
Pithapuram hospital	..	..	..	..	..	1,411 12 4	..
Total ..	2,048 11 1	108 6 0	3,318 4 9	853 10 0	6,812 10 3	16,571 6 5	..

* Outstanding amount up to 31st March 1905.

TABLE VII.—Showing total strength of subordinate Veterinary staff employed during the year 1904–1905.

Province.	How occupied.	Whether paid from Provincial or Local Funds.	Veterinary Inspectors.	Veterinary Assistants.	Remarks.
1	2	3	4	5	6
				NO.	
Madras	In Colleges	Provincial	..	1	
	In Dispensaries ..	Provincial	..	3	
		District Board (2) ..			
		Court of Wards (1) ..			
	On other work ..	Provincial	..	*5	*One to be eventually employed in charge of the Veterinary dispensary proposed to be opened in Rajahmundry.
	Total ..		..	9	

TABLE VIII.—Return of Stud Bulls for the year 1904–1905—*Nil.*

TABLE IX.—Showing main results of the working of Provincial cattle farms during the year 1904-1905—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions under Local Bodies for the year 1904-1905—*Nil.*

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions during 1904-1905.

Horse, pony or donkey.	Province.	Stallions on register on 31st March.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
		The stallions at stud are under the Provincial Department of Government.							
Pony	..	15	*14	15	356	426	25	28	*Inclusive of stallion Rahiman which was without work for a greater portion of the year.

TABLE XII.—Showing average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1904-1905.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	RS. A. 23 5 per month.	RS. A. 20 3 per month.	..	..	Increase is due to the fact that the cost of grain was dear during the year under report.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year 1904-1905—*Nil.**

* On account of plague the pony shows usually held in the Districts of Coimbatore and Salem were abandoned during the year.

TABLE XIV.—Abstract of particulars regarding cattle fairs and shows held during the year 1904–1905.

Province.	Number of Cattle Fairs and Shows held.	Total number of stock present.							Average price of animal sold.				
		Bulls.	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Madras	11	100,903 cattle.						..	The prices were moderate in some places and high in some others.				

Province.	Amount realized in fees.	Total number of animals that competed for prizes.	Prizes awarded.						Number of medals awarded.
			From Imperial funds.	From Provincial funds.	From Local funds.	From other sources.	Total.	Amount actually awarded.	
15	16	17	18	19	20	21	22	23	
	RS.		RS.			RS.	RS.	RS.	
Madras	Information not available.	1,331	1,000	..	..	2,200	3,200	*2,155	3

* Rs. 50 were awarded at the Conjeeveram show.

TABLE XIV-A.—Statement showing cost of the Civil Veterinary Department during the official year 1904–1905 in the Province of Madras.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
	RS.	RS. A. P.		RS. A. P.
1. Salaries of officers	17,775	..	..	17,775 0 0
2. Do. of subordinates	..	12,706 10 5	..	12,706 10 5
3. Travelling allowance of officers	..	1,668 8 0	..	1,668 8 0
4. Do. of subordinates ..	..	* 2,856 5 10	..	2,856 5 10
5. Other allowances—House-rent, Superintendent, Civil Veterinary department ..	..	600 0 0	..	600 0 0
6. Supplies and services—Pony-breeding ..	..	4,722 3 9	..	4,722 3 9
7. Contingencies	..	784 11 0	..	784 11 0
8. Prevention of disease (included against (2)).	..	..	..	..
9. College contingencies	..	14,124 7 11	..	14,124 7 11
0. Prizes at fairs and shows	1,000	..	..	1,000 0 0
Total ..	18,775	37,462 14 11	..	56,237 14 11

* Includes allowance of College staff.

TABLE XV.—Comparative statement of cattle mortality for five years ending 1904–1905.

Causes of death.	Number of deaths among Cattle for the official year.				
	1900–1901.	1901–1902.	1902–1903.	1903–1904.	1904–1905.
Diseases.					
Rinderpest	27,378	18,644	16,555	17,655	19,772
Anthrax	16,106	18,215	13,496	16,887	14,996
Malignant sore throat	7,341	7,662	9,063	13,769	11,317
Black quarter	2,482	2,421	2,989	7,616	7,683
Epizootic aphtha	5,283	4,722	11,456	4,683	2,767
Others	38,951	37,333	35,417	32,548	33,336
Total ..	97,541	88,997	88,976	93,158	89,871
Other causes.					
Snake bite	2,028	1,761	2,109	2,278	2,257
Wild animals	11,564	10,811	10,937	10,886	12,061
Criminal poisoning	47	34	71	71	52
Total ..	13,639	12,606	13,117	13,235	14,370
Grand Total ..	111,180	101,603	102,093	106,393	104,241

TABLE XVI.—Statistics of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during the official year 1904–1905.

Districts.	Number of deaths among Cattle.									
	From diseases.							From snake-bite.	By wild animals.	From criminal poisoning.
	Rinderpest.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Other	Total.			
1	2	3	4	5	6	7	8	9	10	11
1. Ganjám	4,606	1,015	1,075	350	433	3,197	10,676	51	180	..
2. Vizagapatam ..	743	423	487	120	179	303	2,255	35	71	..
3. Gódávari	4,082	2,259	661	178	359	3,892	11,431	164	208	3
4. Kistna	2,322	1,278	1,275	287	199	2,954	8,315	221	59	7
5. Kurnool	502	800	405	1,120	89	3,924	6,840	118	436	1
6. Bellary	404	393	369	423	60	2,400	4,049	65	227	4
7. Anantapur	325	546	182	579	112	2,297	4,041	31	209	2
8. Cuddapah	577	597	393	1,822	109	1,415	4,913	66	453	1
9. Nellore	476	1,327	1,500	493	262	3,242	7,300	254	151	..
10. Chingleput	329	606	364	74	35	381	1,789	152	8	5
11. South Arcot	508	1,906	1,059	135	79	1,977	5,664	176	357	..
12. North Arcot	500	876	740	621	37	800	3,574	185	553	3
13. Salem	369	248	374	359	114	792	2,256	41	346	3
14. Coimbatore	337	243	171	347	201	1,303	2,602	90	671	2
15. Trichinopoly	279	316	191	29	36	1,705	2,556	63	16	1
16. Tanjore	697	729	742	16	25	357	2,566	134	5	5
17. Madura	890	543	350	397	32	979	3,191	118	192	1
18. Tinnevelly	337	301	42	18	19	398	1,115	86	40	2
19. The Nilgiris	3	..	57	4	3	14	81	1	362	..
20. Malabar	885	254	435	25	117	142	1,858	120	2,589	3
21. South Canara ..	102	9	77	62	222	214	686	15	4,897	1
22. Guntúr	499	327	368	224	45	650	2,113	71	31	8
Total ..	19,772	14,996	11,317	7,683	2,767	33,336	89,871	2,257	12,061	52

Districts.	Number of deaths among—*cont.*										
	Cattle—*cont.*			Horses and Ponies.							
				From diseases.							
	Total.	Grand Total.	Total stock by the latest census.	Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand Total.
	12	13	14	15	16	17	18	19	20	21	22	23
1. Ganjám	231	10,907	310,832	..	..	1	1	..	..	..	..	1
2. Vizagapatam ..	106	2,361	128,721	..	..	..	..	..	..	..	..	..
3. Gódávari	375	11,806	.	5	10	13	28	8	9	..	17	45
4. Kistna	287	8,602	786,471	2	4	22	28	4	2	..	6	34
5. Kurnool	555	7,395	219,725	6	2	23	31	..	11	..	11	42
6. Bellary	296	4,345	502,360	7	1	32	40	1	3	..	4	44
7. Anantapur	242	4,283	1,157,178	3	1	30	34	..	15	..	15	49
8. Cuddapah	520	5,433	942,078	7	1	9	17	1	3	..	4	21
9. Nellore	405	7,705	119,176	..	..	19	19	..	2	..	2	21
10. Chingleput	165	1,954	662,698	2	3	2	7	..	..	..	..	7
11. South Arcot	533	6,197	1,158,336	..	..	6	6	..	2	..	2	8
12. North Arcot	741	4,315	896,082	..	5	3	8	..	..	..	..	8
13. Salem	390	2,646	1,019,552	2	1	10	13	1	3	..	4	17
14. Coimbatore	763	3,365	1,151,637	3	2	13	18	..	11	..	11	29
15. Trichinopoly	80	2,636	609,139	..	..	10	10	..	..	..	..	10
16. Tanjore..	144	2,710	936,740	1	1	4	6	..	..	..	..	6
17. Madura	311	3,502	1,143,644	5	5	14	24	2	3	..	5	29
18. Tinnevelly	128	1,243	482,925	..	..	..	..	..	..	..	..	..
19. The Nilgiris	363	444	64,850	..	..	3	3	..	1	..	1	4
20. Malabar	2,712	4,570	908,983	..	..	..	..	..	3	..	3	3
21. South Canara ..	4,913	5,599	616,237	..	..	1	1	..	..	..	..	1
22. Guntúr	110	2,223	..	..	..	5	5	..	2	..	2	7
Total ..	14,370	104,241	13,817,364	43	36	220	299	17	70	..	87	386

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (Rev. Sett., L. Rds. and Agri.), Mis. No. 4289, dated 28th July 1905.

ABSTRACT.—Submitting to Government a report on the operations of the Department of Agriculture for the official year 1904-1905.

Order—No. 816, Revenue, dated 4th September 1905.

Miscellaneous.

The Government have read with interest the report of the Agricultural Department which is on the whole satisfactory, though the work of the department is still much impeded by the absence of an adequate staff both of expert officers and of trained subordinates. The subject of the further development of the department is now engaging the attention of the Government, and as the Government of India have, since the close of the period under review, made a special allotment for the purpose, more rapid progress may now be looked for.

2. Owing to the unfavourable character of the season during the greater part of the agricultural year, the practical results achieved in the Government farms at Bellary and Koilpatti were generally inconclusive. In the Samalkota sugarcane farm, however, some useful and important results were obtained.

3. Detailed proposals for the establishment of a pumping irrigation farm on the banks of the Hagari in the Bellary district for the conduct of experiments in irrigated cultivation and for the determination of the duty of water are under consideration. The Board will be requested to submit a full report regarding the progress and results of the experiments made at Ponnalur in the irrigation of dry crops on black cotton soil.

4. The measures adopted for the selection and distribution of cotton seed which are referred to in paragraph 14 of the report, should be reported in greater detail. How much seed has been collected and distributed, how many officers were employed on the work, and how their services were utilized, whether the assistance of private agency or of village officers was obtained, and other information bearing on the subject should be stated for the information of Government.

5. The Government Botanist and his staff were mainly engaged with economic and general agricultural work. Much attention was not therefore paid to the systematic botanical survey of the Presidency during the year.

6. To facilitate a close study of the diseases affecting ground-nut and to promote the improvement of that industrial crop, a temporary farm has been established in the South Arcot district. The opening of a farm in the Malabar district has been sanctioned to enable a thorough investigation to be made of the pepper-vine diseases prevailing in the district.

7. The Government are glad to note that the Madras Veterinary College worked well during the year and that preventive inoculation against cattle disease was carried on with success. The subject of cattle-breeding is very briefly dealt with, and some statement as to what was done during the year should have been given. The Board will be requested to report specially and more fully on the point. The revised proposals called for by the Board of Revenue from the Superintendent, Civil Veterinary Department, in its Proceedings, Mis. No. 3480, dated 23rd June 1905, for providing cattle-breeders with selected breeding bulls should be expedited.

8. The closing of the Agricultural College at Saidapet and the institution in its stead of a central technical School of Agriculture at a fresh and more promising site are under contemplation. The carrying out of this scheme is the necessary preliminary to any great advance in the operations of the Agricultural Department in this Presidency, as the want of a supply of trained practical agriculturists impedes all expansion at present.

9. The Government view with satisfaction the several steps taken for the dissemination of information regarding the results of the researches of the department. The plan adopted at Samalkota of training a few selected ryots on the farm for a month or so at a time should be extended.

10. The Government consider that more information may usefully be given in the report regarding the nature and value of the work done by Agricultural Societies so far as it comes under the notice of the Director and his subordinates.

(True Extract.)

A. G. CARDEW,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement, Land Records and Agriculture).
„ the Public Department (for Presidency Administration Report).
„ the Educational Department.
„ the Inspector-General of Agriculture.
„ the Inspector-General, Civil Veterinary Department.
„ the Minister of Agriculture, Argentine Republic.
„ the Entomologist to the Government of India.
„ Monsieur Chailley-Bert.
Editors' Table.

Copy to the Government of India (with C.L.).

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1905-1906.

134072

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1906.

Maximum number of pages prescribed—

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Administrative report on the Agricultural stations under the control of the Government Botanist	..
Administrative report of the Superintendent of Pumping Experiments	..
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APPENDIX V—

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REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1905-1906.

I.—PREFATORY.

The post of Director of Agriculture was held throughout the year by the Hon'ble Mr. A. E. Castlestuart Stuart, I.C.S. During the same period, Mr. Benson, Major Gunn, Mr. Barber and Mr. Chatterton held the offices of Deputy Director, Superintendent of the Civil Veterinary Department, Government Botanist and Superintendent of Pumping Experiments, respectively.

2. The Director spent 106 days on tour, visiting all the districts of the Presidency except the Nilgiris, Cuddapah, North Arcot, Tanjore, Trichinopoly, Madura and South Canara, and inspected all the Agricultural stations at Samalkota, Bellary, Hagari, Attur, Palur, Koilpatti, Taliparamba and Hindupur. He opened the Agricultural Exhibition held at Bellary in May 1905, and the Cattle Shows held at Anakápalle and Ongole in February and March 1906, respectively, and further visited Coimbatore in July 1905 in company with Messrs. Shipley, Benson and Barber, Major Gunn and M.R.Ry. C. K. Subba Rao for the purpose of selecting a site for the new Technical School, Research Institute and Central Farm. The work of the Department of Agriculture in this Presidency is expanding so rapidly and its activities have so much increased during the past three years and must continue to increase still more in the near future, that the appointment of a whole-time Director under the control of the Board, as contemplated in the reorganization scheme, will soon become an absolute necessity. The present Director of Agriculture is also a Member of the Board of Revenue, Court of Wards and Legislative Council, Commissioner of Revenue Settlement and Director of Land Records and is practically the head of four public departments, viz., Settlement, Survey, Land Records and Agriculture, and has also to perform the functions of Famine Commissioner and to control the work of the Registrar of Co-operative Credit Societies and of the Special Officer employed to develop industries, *e.g.*, tanning and weaving, in addition to much other work connected with the revenue aspects of irrigation projects, minor irrigation, loans, suits, etc. The work in all these various branches is constantly increasing and in the best interests of the Agricultural Department, it is desirable that it should be provided with a whole-time Director at an early date.

II.—SCIENTIFIC AND NATIONAL ENQUIRY UNDER IMPERIAL DIRECTION.

3. *Entomology.*—Specimens of the locusts which appeared in the Alur taluk of the Bellary district and at Patikonda in the Kurnool district were forwarded to the Imperial Entomologist who found that they belonged to the species of *Acridium Succinctum* (Linn) or the "Bombay locust." A few of the cotton plants at the

Koilpatti Agricultural station having been found to be affected by a disease which was characterised by an abnormal growth of whitish hairs in patches and in many cases also by a curling of the leaves, specimens of the diseased cotton were forwarded to the Imperial Entomologist, and it was ascertained that the cotton leaves were infested with a mite closely allied to the genus *Phytoptus*, that the microscopic mites generally lived on the surface of the leaf and that the velvety growth of hairs was always associated with them and was supposed to be due to the irritation they set up.

4. *Mycology.*—The outbreak of a serious disease among palmyra palms (*Borassus flabelliformis*) in certain taluks of the Gódávari district induced the Imperial Mycologist to visit the affected tracts. He traced the disease to a fungus of the genus *Pythium*—a species new to science. He has since the close of the year furnished an elaborate report regarding the disease and the remedial measures suggested to combat it. It may be noted that the disease has recently spread to both cocoanut and arecanut trees. The Government Botanist has been requested to report whether it will be practicable to adopt the measures suggested by the Imperial Mycologist during the next cold season.

5. *Imperial Institute.*—Specimens of about fifteen kinds of vegetable food used by the poorer classes of people in times of scarcity or famine and 6 lbs. of Tinnevelly cotton seed were forwarded to the Reporter on Economic Products, and at his instance steps were also taken to supply him with specimens of native pens made from Indian reeds sold in the bazaars.

6. Tobacco seed of the typical varieties grown in this Presidency was sent to the Imperial Agriculturist for experimental cultivation at the Pusa farm. Similarly, one pound of seed of the Bourbon variety of tree-cotton grown in the Coimbatore district and a parcel of lemon grass plants were forwarded to the Director of Land Records and Agriculture, Eastern Bengal and Assam, while half a pound of seed of the different types of Sunn hemp (*Crotalaria juncea*) cultivated in the Gódávari district was supplied to the Superintendent, Royal Botanical Gardens, Calcutta. One pound of coffee seed from the Nilgiris was forwarded to the Inspector-General of Agriculture for cultivation in Australia; and arrangements were made for the supply to him of two pounds of Jadapratti (Kidney cotton) tree-cotton grown at the Bellary Agricultural station for experimental cultivation in West Africa as well as for the transmission of ten to twenty plants of bananas (*Musa sapientum*) from the Malabar coast to German East Africa for the same purpose. Samples of the lint of certain perennial tree-cottons were collected in this Presidency for Messrs. Shaw Wallace and Company, Calcutta, and were at their instance valued by Bombay trade experts. Thirty samples of wheat and some samples of leaf tobacco were also forwarded to Pusa for exhibition at the meeting of the Board of Agriculture held in January 1906. With a view to the despatch of a third consignment of lemon grass plants to the West Indies, a set of plants was obtained from the Conservator of Forests, Cochin, and established in the open at the Agri-horticultural Gardens, Madras, but they did not thrive owing to the unfavourable character of the season. A further set planted at the Taliparamba farm having also been found to be backward, a fresh collection of plants has been made since the close of the year, and steps are being taken to establish them in a Wardian case for transmission to the West Indies.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

7. The Agricultural Probationer who had been receiving practical training at the farms of the Bombay Presidency returned in March 1905.

During the year under report the Agricultural stations at Samalkota and Palur were placed on a permanent footing As stated in paragraph 7 of the report for 1904-05, a permanent station was opened at Taliparamba for the investigation of the pepper vine diseases prevailing in the Malabar district. Further, a pumping station was newly started on the banks of the Hagari in the Bellary district and near the town of Bellary for the purpose of investigating problems connected with the irrigation of paddy and cotton on black cotton soils such as are met with in the tracts commanded by the Tungabhadra Irrigation Project. The pumping station at Attur in

the Chingleput district, referred to in paragraph 24 of the report for 1904–05, was converted into an Agricultural station for the purpose of making a thorough trial of exotic and perennial cottons under irrigation and for conducting experiments in the growth of fodder crops and fruit trees and in the conservation and application of cattle manure. Steps were also taken to open a permanent farm at Nandyal in the Kurnool district to be devoted mainly to a thorough study of the "Northerns" variety of cottons and to remove, by the propagation of pure seed, the evils of admixture prevailing in the locality. The most important administrative change made during the year was the decision to close the Agricultural College at Saidapet and to institute in its stead an Agricultural College and Research Institute in conjunction with a Central Farm on the most approved modern principles. A suitable site was selected near Coimbatore and acquired during the year and steps were taken to bring the land into order and to equip the farm with live-stock and agricultural implements.

8. As stated in paragraph 8 of the report for 1904–05, the main problems to be solved at both the Bellary and Koilpatti stations were the extent to which "deeper tillage" would operate as a remedy for the evil effects of drought and the determination of the comparative value of the various methods of collecting and utilizing cattle manure. At the Bellary station, the series of tillage experiments in field No. 3 were continued though no further deep ploughing was done on any of the plots during the year. The outturns obtained presented considerable discrepancies but may, on the whole, be said to indicate a slight benefit from the previous deep tillage in the case of the grain crop while, in the case of the cotton crop, the superficial tillage with the country plough performed during the year gave slightly better results. At Koilpatti, experiments in "deeper tillage" were suspended during the year as the land set apart for the purpose could not be brought by Mr. Benson into proper condition with the ordinary cultivation of the locality. At the Bellary station, the experiments designed to test the three methods of conserving cattle manure (*viz.*, the box, the byre and the pit systems) were continued on the identical plots of field No. 2 manured in the previous year: for the collection of manure under the pit system, a new pit was made and provided with a shed which did not, however, serve to secure the satisfactory decomposition of the collections, and the manure thus conserved lost a most extraordinary amount of nitrogen and phosphoric acid whilst in the manure heaped in the open to which the urine of the cattle was not added, the proportion of nitrogen and potash was unduly high. The manures thus collected were applied to certain plots sown with korrapatti (Italian millet, two rows, and cotton, one row) and though, owing to unfavourable season, the results obtained during the year under report were inconclusive, it may be inferred from the outturns obtained by the application of manures during the past three seasons that the box manure gave the best results so far as the korra crop was concerned and the worst in the case of the cotton crop and that the best yield in the case of cotton was obtained from unmanured plots. At Koilpatti also, the analysis of the collections of manures under the three systems mentioned above disclosed discrepancies; and, as to results, no conclusions can be arrived at until the outturns of the cotton crop to which the manures were applied are known.

A fresh series of experiments in the application of artificial manures was at the suggestion of the Inspector-General of Agriculture conducted at both the stations during the year in order to test their value on cotton grown in the ordinary local rotation and on cotton grown continuously. The analysis of the soils at the Bellary station having shown that their great defect was in phosphates and nitrogen, a scheme for supplying the want by applying to certain plots, which had received no manure previously, oil-cake at 1,000 lb. per acre or saltpetre or superphosphate at 300 lb. per acre was adopted, and the plots were sown with korrapatti [korra (*Setaria italica*) and cotton] in order to determine the effect of the manures on cotton grown in rotation; the result was that in the case of korra, the oil-cake gave better results than even the box manure, the saltpetre showed a material increase on the unmanured plot and the superphosphate had no effect at all; while, in the case of cotton, the saltpetre plot showed a small increase over the unmanured plot and the superphosphate and oil-cake plots showed the smallest yields. To the plots set apart for the continuous cultivation of cotton, several kinds of artificial manures (oil-cake, superphosphate, saltpetre and basic slag) were applied, either singly or jointly, and a plot was also left unmanured; but

owing to scanty rainfall, the results obtained were discrepant and indicated that none of the manures had any effect on the yield. The tests will, therefore, be continued. The results of the similar application of manures at the Koilpatti farm will only be known after the cotton crop is harvested though it may be observed that the past season was not favourable to obtaining any results of value.

9. At the Bellary station, sorghums of a number of varieties, local and foreign, were sown, in addition to cotton and korra grown on the experimental plots, either with a view to the selection of seed or in the ordinary course of farm management. Owing to the unfavourable character of the season, no results of practical value could be arrived at, but effort was concentrated on securing the best possible supply of seed for the next year. A small trial of Bombay fodder sorghums was made under irrigation, and it is reported that the "Nilwa" and "Sundhia" varieties maintained their reputation at Bellary and especially the former, though the latter is the quicker grower.

10. At Koilpatti also the season was unfavourable, and the chief crops grown in addition to cotton, tobacco and foreign varieties of paddy were cumbu (*Pennisetum typhoideum*) of local and foreign sorts, sorghums (*Andropogon sorghum*) of certain local varieties, ragi (*Eleusine coracana*), sweet potatoes (*Ipomœa Batatas*) and chillies (*Capsicum frutescens*). Cumbu of the local sort was sown over about $3\frac{1}{2}$ acres and yielded only 1,057 lbs. of grain, while the foreign varieties of cumbu yielded poorer outturns, and the chilly crop almost failed, under the seasonal conditions experienced. Fodder sorghum (chola-nattu) was grown as usual; but, owing to the bad state of the season, the experiment of cutting the crop at different stages in order to determine the best time for cutting the crop from a fodder point of view was not repeated. The growth of the Irungu sorghums was continued and sufficient seed propagated by "sorts" to allow of field tests of the varieties being made later on. In the case of ragi, a trial of the relative merits of the ridge-and-furrow and flat-bed systems of planting was continued but, though the conditions of the season were not favourable to a satisfactory record, the advantage of adopting the former system was again proved. As regards sweet potatoes, an attempt was made to test the effect of lifting the vines to prevent their rooting, and the result shows that this practice was attended with some small advantage; the relative advantages of planting the vines in flat-beds and on ridges was also tried but, owing to unfavourable season and scanty water-supply, no conclusions of real value could be arrived at.

11. *Sugarcane.*—The Samalkota station having been placed on a permanent footing, a block of land measuring 36 acres was acquired and laid out, and most of the permanent works and improvements required were carried out. The whole cultivable land was divided into a series of blocks, the necessary paths and roads, drainage channels, jaggery store shed and cattle sheds were provided, the main irrigation channel was straightened and otherwise altered suitably, and three dams with revetments and aprons were made along the course of the channel. Finally, a bund along the Elleru river has been transferred by the Public Works Department to the farm, and it affords sites for buildings. The season was generally unfavourable for experimental work owing to scanty or unseasonable rainfall, and there was also a serious outbreak of disease which vitiated the results from many of the experimental plots. The experimental plots were further disturbed by the urgent need for the distribution of canes to various places, including the Palur Agricultural station and the pumping station at Melrosapuram; but this disturbance will, in future, be avoided owing to the steps taken to open a cane nursery at Melrosapuram. The experimental plots were, as usual, divided into three classes, namely, the varietals, the manurials and methods plots.

The *varietal plots* were slightly rearranged, some canes being transferred from class B to class A, as they seemed worthy of detailed study and extended cultivation. In the *methods plots*, experiments were conducted in the use of trash, in green-dressing, the parts of canes to be planted, the number of sets to be planted per acre, stool-planting, wide-planting, nursery seed-bed, bamboos for supports and planting in June and September, while the question of ratoons received special attention because of the spread of disease. In the *manurial plots*, cattle manure, castor cake, a mixture of the Pungam (*Pongamia glabra*) and Nim (*Melia azadirachta*) cakes obtainable locally and a "general cane manure" were applied to the canes, and the results recorded. The "disease plot" was continued; unsuccessful attempts were made to raise

seedling canes on the farm and in the greenhouse at Ootacamund; studies were made regarding early-maturing canes and the destruction of jackals, while canes were planted in June and September for sale at local festivals. A careful botanical study of the canes grown on the station was also made. Specimens of the Mauritius canes grown at the farm were sent with paintings, drawings, descriptions and measurements to the Director of the Government Plantation in the Mauritius for the determination of their right names. As in previous years, canes of good varieties were distributed to select cultivators in the Gódávari district. The reports of the officer deputed to inspect the plantations speak of the successful cultivation of farm canes by the ryots and the general replacement of the local varieties by the farm canes. The new canes have taken a firm foothold in the district and they are all retained or sold for planting.

Other crops grown in the wet area of the station were several varieties of paddy and the best local plantain. In the dry area, dry paddy and red gram (*Cajanus indicus*) were grown in rotation with sugarcane, while other such rotations were chillies (*Capsicum frutescens* and turmeric (*Curcuma longa*). Turmeric was especially successful, while chillies and red gram yielded an indifferent outturn owing to diseases caused by drought.

12. *Ground-nut.*—As stated in paragraph 12 of the previous year's report, the Agricultural station at Palur in the South Arcot district was started in view to (1) the study and improvement of the ground-nut crop in the same manner as sugarcane is studied at Samalkota, and (2) the introduction of superior varieties of sugarcane. It consisted of 16 acres of wet and dry land under irrigation from a channel and two wells respectively. The season during the year was in the main unfavourable, owing partly to deficient and partly to unseasonable rainfall. All the varieties of ground-nut available in other districts and in other Provinces and the Japan, American and African varieties were got together and grown at the station and as far as possible compared in regard to their growth and yield with the local varieties, while one cwt. of the Mauritius seed was also imported direct in order to test the relative values thereof and of the seed imported into the district ten years ago. On dry land there were two crops during the year, one rainfed and the other irrigated; and a small extent of wet land was also planted. The crops were, however, attacked with *Surul puchi* (*Anacampsis nextoria*, Meyr.); this and other diseases of the crop were carefully examined during the year as opportunity offered. The various kinds of ground-nut grown were subjected to a careful botanical analysis and fifteen samples of pods were forwarded to the Imperial Agricultural Chemist for determining their oil content. The sugarcanes which were successfully grown at Samalkota were introduced into this station and planted partly on dry and partly on wet land. The canes grown on the dry land were analysed by the Chemist to Messrs. Parry & Co. at Nellikuppam, but those on wet lands had not matured sufficiently before the end of the year for analysis. Owing to difficulties in obtaining an adequate supply of water, the nursery system of planting was introduced, and this has been adopted by local cultivators. Indigo was grown at the station as a rotation crop, the other rotation crops being gingelly (*Sesamum indicum*, DC.), ragi (*Eleusine coracana*, Gœrtn.) and paddy, while a few cotton plants were also grown. Guinea grass was also successfully introduced at the station. The Imperial Agricultural Chemist's report on the analysis of the soil having shown that it was "well supplied with mineral plant food and should prove very fertile if manured with ordinary farm manures," attention was paid to the improvement of manure. The station was towards the close of the year placed on a permanent footing and a block of land measuring acres 51·69 surrounding the present site was selected and acquired; of this area, 13 acres are wet and 38 acres are dry and fairly provided with wells.

13. *Pepper.*—With a view to improving the pepper industry in all its aspects including the raising of new and improved varieties and their wide distribution over the Malabar district, an extent of 84 acres in the village of Taliparamba, Chirakkal taluk, consisting of pepper gardens, hill paddy, wet land, scrub, pasture and forest was acquired during the year; and all the permanent improvements necessary were carried out. The site of the station has been divided roughly into 80 inspection plots of convenient size with paths between. The season of the year was abnormal. The study of pepper in all its branches was undertaken, the local practices were studied and compared with those of other parts, especially the Wynaad. Though touring in the district was not neglected the actual pepper at the station received most attention;

the 80 plots thereof were exhaustively studied and the harvest from each plot was kept separate. Among other lines of observation in the plots, the effect of shade and aspect, soil and moisture were being studied, and experiments in mulching, manuring, moulding and pruning were being carried out, while leaf pits were also dug as in the North Canara gardens. The botanical and vernacular names of the standards to which the pepper vines cling were determined and their relative popularity among the native pepper growers studied. Further, the sexual differences of the pepper varieties grown on the station were noted and several new kinds were introduced into it including, notably, the three best Wynaad kinds and cultivated pepper from Bombay and Burma. The diseases of the vines were carefully noted and certain areas marked and numbered as " disease spots " and will later on receive special attention. As a subsidiary study, the cultivation of the district was being investigated, the chief of the subjects of study being the growth of hill paddy with murukku (*Erythrina indica*, Lam.) standards, the wet paddy and the local grams and pulses. The other work carried on at the farm consisted in the introduction of guinea grass (*Panicum maximum*, Jacq.) for fodder purposes, the cultivation of long-stapled cotton, the establishment of a set of lemon grass (*Andropogon Nardus*, Linn.) plants from roots obtained from Ceylon and Cochin and the planting of rooted cuttings of rubber (*Ficus elastica*) obtained from Burma.

14. *Imperial grant of* 1½ *lakhs for the development of agriculture.*—In pursuance of the scheme for the development and expansion of the Agricultural department, the Government of India sanctioned, during the year, a perpetual subvention of Rs. 1½ lakhs for this Presidency which will, with the grant that may annually be made by the Local Government, go far towards helping the Department in making substantial progress in the improvement of agriculture. The grant was during the year utilized (1) in acquiring the site required for the establishment at Coimbatore of the new Agricultural College and Research Institute and Central Farm in the place of the existing College of Agriculture at Saidapet which is to be abolished and in making explorations for water in and equipping the farm and in purchasing materials for fencing and farm sheds, (2) in placing the Samalkota and Palur agricultural stations on a permanent footing, (3) in opening a cotton farm at Nandyal in the Kurnool district, and (4) in making improvements to the existing agricultural stations. The addition to the staff of two Agricultural officers, viz., a Principal of the combined College and Research Institute and an Agricultural Chemist, was also sanctioned ; but these badly needed experts have not yet arrived.

15. *Cotton.*—At the Bellary agricultural station, the experiments in the improvement of indigenous cotton were conducted on two lines, namely, (1) the endeavour to improve the stock worked on in previous years by selection and crossing mainly *inter se* and (2) the experimental growth of good seed of cottons of different strains collected in the early part of 1905 in the tracts on which the trade depends for the sorts known as " Northerns " and " Westerns ". Several strains of cotton raised and selected either at Bellary or Koilpatti for further trial as well as Badnehal seed, a cotton with a great local reputation, were sown with a view to further selection and crossing ; some of these did fairly but not well on the whole. The seed of several varieties obtained by crossing in previous years was also sown again. In character of growth these came on true to type and, in some promising cases, showed astonishing vigour ; and their yield was also, in a majority of cases, a decided improvement on that obtained from uncrossed strains, but it remains to be seen how the lint turns out. Professor Gammie, Economic Botanist, Bombay, visited the station during the year under report and expressed the opinion that the experiments were being conducted on the right lines by a rigid course of selection and crossing *inter se* with the best and most productive plants. He further hoped that some of the forms that might be developed at the station might prove commercially valuable when tried on a larger scale. As stated above, work was also done in the collection and growth of seed of different strains of the " Northerns " and " Westerns " varieties found in ryots' fields. The year under report being the first of their production, no opinion can be expressed on their relative merits. Government have, however, recently ordered the discontinuance of this line of work on the grounds that agricultural stations should be used for strictly comparative experiments and that arrangements can be made for the cultivation of the best local varieties by the agency of ryots under agreement, if necessary, far better than they can be grown on the stations.

The "Bombay cotton" referred to in paragraph 14 of the previous year's report flourished fairly, but the outturn was not quite satisfactory. The Peruvian cotton, mentioned in the same report, proved a failure, while the Caravonica cotton plants made no growth on the soil of the Agricultural station.

At the Koilpatti Agricultural station it was for the first time possible to sow a fair area with pure seed of the Uppam and Karanganni varieties separately, and a supply of a new stock of the former sort was also obtained and sown on a separate plot. The product of the crosses made in previous years was also sown after careful selection with a view to obtaining early yielding and prolific varieties. The Cambodia cotton, referred to in the previous report, was again sown, but neither in this nor in the case of the other experiments with the cotton crop would any purpose be served by further reference thereto as the crop is still standing.

At the new Agricultural station at Attur a start was made by the growth, under irrigation, of Caravonica, Sea Island and Egyptian tree cottons. The plants are in a very healthy state; but as no lint has yet been produced, it is too early to decide on their relative merits.

At the Taliparamba Agricultural station an attempt was made to plant cottons of long staple, but the seed was sown late and the growth was unsatisfactory. Further trials will be made.

As stated in the concluding clause of paragraph 14 of the previous report, arrangements were made during the year under report for the distribution of the pure seed of several varieties collected in the Kistna, Cuddapah, Anantapur, Bellary, Kurnool and Tinnevelly districts; but owing to the season for sowing having commenced unusually early, much of the seed was placed on the market rather late and the condition imposed on the ryot of paying for the seed in cash militated, to some extent, against its ready sale. It is, however, gratifying to note that in the Bellary and Tinnevelly districts, in which special enquiries about the results of the distribution were made, the crop grown with such seed as was sold yielded more than the ordinary seed and gave a higher percentage of lint than the ordinary cottons and that the advantages of sowing the selected seed were fully appreciated by the ryots.

With a view to working, through the growers of cotton crops themselves, towards the removal of the cardinal defect prevalent in the Nandyal valley, viz., the admixture of cottons, a premium of two annas per acre was offered for every acre of practically pure cotton that might be grown in the season of 1906 within the taluks of Nandyal, Sirvel and Koilkuntla in the Kurnool district and Jammalamadugu and Proddatur in the Cuddapah district. Claims for premia were preferred in respect of about 13,000 acres, of which about 2,400 acres were, on investigation, found eligible for the reward. The ryots have been strongly advised to keep the pure cotton seed for future cultivation and to take care not to allow it to get mixed again with impure varieties.

Several American varieties and Caravonica cotton were tried by a few private individuals in the Cuddapah district but they were all found to be liable to great damage by insect-pest except in a single case where the crop was grown under irrigation from a well.

During the year under report Mr. Fyson, Professor of Biology, Presidency College, conducted experiments in crossing cottons with a view to making a scientific study of the subject and was supplied with different varieties of seed and with the necessary funds. The result of his trials was embodied in a preliminary report which it was considered premature to publish. The experiments will be continued on a larger scale at the Attur Agricultural station during the current year.

16. *Tobacco.*—As stated in paragraph 15 of the previous year's report, good tobacco leaf grown in selected gardens near Dindigul was purchased and delivered to Messrs. Spencer & Co. for drying and curing with a view to secure a better class of "wrapper" leaf than is obtained under the ordinary practice of the centre. Curing was carried on both in shade and in the open as usual; and notwithstanding the scarcity of water-supply during the year and the consequent unsatisfactory quality of the leaf obtained, Messrs. Spencer & Co. secured a high quality of cured leaf by paying careful attention to detail in fermentation, and the leaf so cured was allowed to mature for more than the usual period with a view to determine whether any improvement in

flavour and burning quality could be obtained thereby. Samples of the cheroots made by Messrs. Spencer & Co. with the covering leaf thus cured by them were sent to a few leading firms dealing in tobacco, and their opinions, though not altogether favourable, were to the effect that the covering leaf was an improvement on the ordinary Indian wrapper tobacco obtainable and was well cured, but that no very satisfactory test as to the quality thereof could be arrived at in the absence of the unrolled leaf which had all been used up; the samples laid before the Board of Agriculture at its second meeting at Pusa in January 1906 attracted much favourable attention. Towards the close of the year under report, fresh arrangements were made with Messrs. Spencer & Co. for the purchase and curing of leaf by them on behalf of Government subject to the conditions that the cured leaf should be treated as the property of Government and that if success is attained a full account of the methods of curing adopted should be made available for the information of the public: the results of the experiments will be awaited, but it may be noted in this connection that the conditions of the season of 1906 were even more unfavourable for the conduct of experiments than those of 1905.

In order to encourage the introduction of superior foreign varieties of tobacco and the conduct of experiments to find out, whether any, and if so, which of them, could be grown in this Presidency in such a way as to retain their distinguishing characteristics, viz., a good smoking quality and a light coloured ash, Government granted a lease of 150 acres of lanka land in the Gódávari district to Mr. T. H. Barry for experimental cultivation for five years, free of rent, on the conditions mainly that he should personally conduct experiments in tobacco cultivation on the leased area with the aid of approved and up-to-date appliances and in consultation with and under the supervision of the officers of the Agricultural department and should furnish Government with all information, particulars and results of such experiments whenever called upon to do so. Seed of the Sumatra and several of the American varieties was obtained and supplied to Mr. Barry for experimental cultivation during the year, but tobacco being grown in lanka tracts without irrigation, no satisfactory results were attained owing mainly to the character of the season and in part to the late arrival of the seed. Fresh seed will be obtained from Pusa and supplied during the current year and the experiments continued. A small quantity of the seed of the American varieties obtained for Mr. Barry was sown at the Koilpatti Agricultural station, along with chillies, under irrigation; and of these, one sort, namely, Kentucky white burley, attracted a good deal of local attention on account of the size and weight of the leaf; it will be further tried.

17. *Aloe plantation.*—The agave plantation at Hindupur was maintained during the year; but the growth of the plants continued to be irregular. A number of suckers was collected into nurseries with a view to the extension of the plantation, but this work was deferred owing to other and more pressing calls on the staff available. The trial of the relative merits of certain methods of cultivating agaves, referred to in paragraph 16 of the previous year's report, were not carried out by Mr. Benson during the year. The reasons assigned were that, as the plantation did not need drainage, the method of draining could not be applied and that the respective growth of plants under shade and in the open could not be properly tested for want of shade; nor was it possible according to Mr. Benson to do anything effectual towards testing the comparative value of clearing only the large growing plants and thoroughly weeding them, as the whole place had previously been cleared out. A small portion of the plantation has, however, been since left to nature, and the relative values of this process and of clearing have yet to be determined. As regards the output, the matured leaves (4,579 in number) at the plantation were trimmed from 362 well-grown plants, and from the results of the extraction of fibre therefrom by hand and from the reports of Messrs. Chambers & Co., Madras, on the quality of the fibre, it appears that the leaf at the plantation contains a satisfactory percentage of fibre (3 per cent.) and that, with care, this fibre can be turned out in appearance and quality that will command more than £32–33 per ton in public sale in London but the cost of extraction proved excessive, having amounted to £28 per ton. Further and more conclusive trials will be made when a larger quantity of leaf is available.

Samples of muslin, napkins, rugs and door mats manufactured wholly or largely from fibre extracted from the Bastard aloe (*Agave vivipara*) were received from the Superintendent, Central Jail, Rajahmundry, and forwarded to the Reporter on

Economic Products who considered that the rugs indicated a new commercial outlet for the fibre; he retained the samples for exhibition in the Economic Court of the Indian Museum.

18. *Foreign varieties of paddy.*—Of the several extra-provincial varieties of paddy referred to in paragraph 17 of the previous year's report, trials were made with eight sorts on plots of adequate size at the farm attached to the Agricultural College, Saidapet; they were grown partly on the transplanting method under irrigation from the oil-engine and pump or from the Mylapore tank and partly on the broad-cast system under the tank. The crops, especially those under the tank, were affected by drought and yielded at rates ranging from 1,547 to 3,469 lbs. per acre under the system of transplantation and from 273 to 1,323 lbs. under the broad-cast system: the experiments were not, however, conclusive as to the comparative merits of the different varieties and will therefore be continued. At the Koilpatti Agricultural station, the propagation of seed of the Banko and Halki varieties was continued on small areas with results less favourable than in 1904–05 but not altogether unsatisfactory in the case of Banko paddy which, with 29 acre-inches of water, gave 1,700 lbs. of grain per acre. The Halki variety gave only 929 lbs. per acre with 33 acre-inches of water. The results of the trial of these varieties in the Shiyali taluk of the Tanjore district have not yet been reported. Seed of the Banko paddy grown at the Koilpatti farm was distributed in 1904–05 to 32 ryots scattered over all except two taluks in the Tinnevelly district; but the crop was grown successfully by only six ryots. The failure in the other cases is, however, ascribable to the insufficiency of water, to the saltish nature of the soil planted on and, above all, to want of care: seeing that fair results were obtained with care at the home farm attached to the Sivagiri estate, under the superintendence of the Court of Wards, there is no reason why equally good results could not have been obtained by ordinary ryots. A fresh supply of seed was distributed to ryots during the year under report and the results of the renewed trials are awaited.

19. *Indigo.*—Among the varieties of indigo which were grown as a rotation crop at the Palur Agricultural station referred to in paragraph 12 *supra* were the Java-Natal (*Indigofera arrecta*) and the newly rediscovered *Indigofera longeracemosa* of Travancore, but they did not flourish owing to the general drought in the South Arcot district. A set of cakes of locally prepared indigo was forwarded to the Indigo Expert to the Government of Bengal who analysed and compared them with the Bengal product.

20. *Saline soils.*—The experiments in the reclamation of saline soils under the Periyár project referred to in paragraph 20 of the previous report were continued under the supervision of the local officers of the Public Works Department. The inspections made by the late Deputy Director of Agriculture during the year under report and the recent analyses of the soils of the plots experimented on, show that their chief defect has for the most part been removed by the drainage and tillage which the plots have undergone and that what the plots now need is mainly good cultivation. Some of the plots yielded fairly during the last season, and arrangements are being made for the continuance of the experiments during the current year.

With the object of inducing ryots holding lands under the Periyar project to make attempts on their own account at reclamation of saline soils, Government offered to remit the full assessment on such lands for three years. Some of the ryots having agreed to conduct the experiments, the soils to be reclaimed were examined chemically, and the methods of reclamation to be applied in each case were determined by the late Deputy Director of Agriculture. Though attempts at reclamation were made in 22 cases, none of the ryots, except one, conducted the experiments in the manner suggested by the late Deputy Director of Agriculture, either because of their general indifference or of their unwillingness to incur the expense that the experiments would have entailed. The Periyar Special Deputy Collector and the Divisional-officers and Tahsildars have been instructed to persuade the ryots to conduct the suggested experiments in the current year, and the results will be awaited.

21. *Paspalum dilatatum.*—Several leading ryots and Agricultural Associations were supplied with the seed of this fodder grass in 1904–05 for experimental cultivation, but reports were received from only two Associations, and these were of

an unfavourable character. Nor did the grass flourish at the Bellary Agricultural station, the experiments there going to show that it cannot stand the long dry season without irrigation and that, even if it is watered from time to time, it is not equal to the sorghums in importance as a fodder plant. At Koilpatti, on the other hand, where a small plot of one-eighth of an acre in the red soil block was planted out with the grass and the sets were placed two feet apart in either direction, it struck well and stooled considerably and between April and October yielded 3,030 lbs. of green fodder in five cuttings. The stools were then planted over an extended area of 45 cents and in December yielded a further quantity of 864 lbs. Judging from the experience at this station, it is clear that the grass will not, on a light soil, withstand an ordinary hot weather but will yield fairly if tended with care and watered frequently. Further experience is needed before the plant can be pronounced to be suitable for ordinary cultivation as a fodder grass.

22. *Nitrogen-fixing bacteria.*—The nitrogen-fixing bacteria obtained from America and forwarded to the Curator, Government Botanic Gardens and Parks, the Nilgiris, in May 1905 for trial, were applied to the seed of five leguminous crops, viz., "Berseem" or Egyptian clover, lucerne, white or Dutch clover, red clover and common pea; and the seed so inoculated was sown in 5 plots of good alluvial soil in Sim's Park, Coonoor. The seed was, for the most part, washed away by an unusually high flood. Of the seedlings which escaped the inundation, the berseem grew fairly well but had no healthy appearance while the pea grew well at first but died before it produced pods. A few plants of the red clover survived and appeared to be in vigorous health but equally healthy plants are to be seen on the hills without similar treatment. Similar experiments with bacteria obtained direct from America were carried out at the Agri-Horticultural Gardens, Madras, upon various garden plants, but owing to the hot weather setting in earlier than usual, the experiments were not successful. A fresh consignment was obtained, and experimental plots of lucerne, peas and beans were put down and treated with this bacteria; the plants in the plots are said to look very healthy.

23. *Jute.*—As stated in paragraph 25 of the report for 1904–05, true jute was cultivated departmentally at the Samalkota Agricultural Station on a small scale with a view to seeing whether it could be successfully grown in the Gódávari and Kistna delta. Of the seed received from the Inspector-General of Agriculture 8 lbs. of four varieties of *Corchorus capsularis* and 3 lbs. of two varieties of *C. olitorius* were sown in separate plots measuring 90 and 40 cents, respectively; but owing to insufficient knowledge of the crop and the correct time of sowing it, only 150 and 17½ lbs. of fibre per acre valued at Rs. 7–8–0 and 1–0–0 respectively were obtained. Comparative experiments are being made again during the current year under the advice of Mr. Finlow, the Bengal Jute Expert, who visited the station and inspected the fibre produced. A small quantity of the jute seed was supplied to the Rev. Mr. Thomssen of the American Baptist Mission at Bápatla and sown by him in the Romperu swamp, Guntúr district, but the plants were killed by the rains and floods of August 1905, a result which seems to indicate that the conditions of the swamp are unfavourable for jute cultivation.

At the instance of Messrs. Wilson & Co., the Collectors of Ganjám, Vizagapatam and Gódávari were asked to send samples of the jute grown in their districts to the Government Botanist for examination; but the result has not yet been reported.

24. *Experiments in the irrigation of dry crops on black cotton soils.*—During the year under report, the ryots holding black-soil lands under the Ponnalur tank commenced the timely cultivation and irrigation of dry crops therein, but owing to paucity of hands, no agricultural subordinate could be deputed to record full particulars of irrigation and outturn or to help the ryots in the conduct of the experiment. As, however, the experiments made in 1904–05 have proved that light watering does no harm to black soils, it is hoped that the ryots will gradually avail themselves of the entire water-supply of the Ponnalur tank for the irrigation of dry crops.

25. *Lima beans.*—In 1903, a small quantity of white lima beans (*Phaseolus lunatus*) was supplied by Messrs. Praschkauer & Co. of London, for cultivation in this Presidency and they were sown at the Bellary and Koilpatti stations as a vegetable or garden crop under irrigation and tended with special care, and the beans were very much appreciated. A small quantity of seed of local growth was sent to the above firm at their

request. The article having met with their approval, it was left to them to make their own arrangements with local exporting firms for the cultivation of the bean in this Presidency. The seed raised at the Agricultural stations was also supplied to the Tanjore Agricultural and Industrial Institution and to other Societies desirous of trying it; but the results of the trial are not yet known. In view of the remarks made in the Government of India Agricultural Ledger No. 2 of 1905 that lima beans of certain varieties contained prussic acid, samples of the bean grown at the two stations mentioned above were forwarded to the Imperial Agricultural Chemist for analysis and report as to whether the beans contained prussic acid in such proportion as to render them unfit for consumption. The seed from the Koilpatti station was reported to be free from Cyanogenetic glucoside, while that from Bellary was stated to be probably free from such glucoside. Further investigation will be made in this important matter.

26. *Agricultural Exhibitions and Associations.*—Agricultural exhibitions in conjunction with Cattle Shows were held at Bellary in May 1905, at Anakápalle in February 1906 and at Tanjore in March following. At the Bellary Agricultural Exhibition, the lectures delivered by Mr. Benson on the evils of the admixture of cotton found in ordinary field crops in the Bellary and Kurnool districts and by Mr. Chatterton on the use of oil-engines and chrome-tanning processes excited a good deal of interest. During the Tanjore Exhibition, a convention somewhat after the American system was held at which Mr. Benson delivered an address on tillage and tillage implements, and Mr. Sampson, Agricultural Expert of the Court of Wards, addressed the meeting with reference to his experience in South Africa, while several members of the Association recounted their experience in practical agriculture. As stated in paragraph 23 of the report for 1904–05, a Central Agricultural Committee was established in connection with the Victoria Technical Institute with the Director of Agriculture as Chairman, and Mr. H. K. Beauchamp, C.I.E., and M.R.Ry. Dewan Bahadur Rajaratna Mudaliyar Avargal, C.I.E., as Honorary Secretaries. Several Rajas, zamindars, large land-owners and other leading men became Members of the Committee. The Madras Chamber of Commerce, the Madras Landholders' Association, the South Indian Planters' Associations and the District Agricultural Associations which have been formed in almost all the districts of the Presidency together with a number of branch Associations, are also represented on the Committee. The Committee holds quarterly meetings and discusses matters connected with the improvement of agriculture as also the various questions raised by District Agricultural Associations. The Proceedings of the Committee are published, and it further issues bulletins on matters of special interest and circulates them to District and Branch Agricultural Associations. The bulletins of the Madras Agricultural Department are supplied to all the Associations, and steps have been taken to supply the District Agricultural Associations with the bulletins of other Provinces. Several of the District Agricultural Associations have started or are about to open experimental farms. Many of the Agricultural Associations are now paying special attention to the main agricultural defects of their districts and taking steps to remedy them with the advice of the officers of the Agricultural Department. They are also carrying on experiments in the conservation of cattle manure according to the loose box system and in improving the supply of manure by growing such plants as indigo, wild indigo, guinea grass, sunn-hemp, etc., and such trees as the rain tree, pungam, etc., the leaves of which can be utilized as green manure. The experimental cultivation of new crops such as foreign varieties of sugarcane, ground-nut, several varieties of exotic cotton and tobacco, Banko paddy and lima beans was undertaken in several districts. Attempts were made to extend over a wider area agricultural practices hitherto restricted to certain districts, *e.g.*, the cultivation of sunn-hemp as a second crop, the growth of pulses on the bunds between paddy fields, the introduction of seed-drills from the Ceded districts and the plantain fibre-extracting machine from Tanjore and Melrosapuram, the application of tank and channel silt to dry land, the improvement of the supply of fodder by the cultivation of sorghums and the ploughing of black cotton soil in such districts as Tinnevelly with the cotton soil plough which is in use in the Deccan districts. The more noteworthy and promising of these experiments are the "co-operative field experiments" undertaken by the Members of the Tanjore Agricultural and Industrial Institution at the instance of the Deputy Director of Agriculture and under the advice of an Agricultural Inspector specially deputed for the purpose. The Vizagapatam District Agricultural Association has opened a dépôt at Vizianagram for the manufacture and sale

of improved ploughs and other cheap agricultural implements which are said to be in great demand not only in this Presidency but also in other Provinces. The question of encouraging cultivation under wells by the introduction of efficient irrigation pumps was also receiving special attention.

27. *Pumping experiments.*—During the year under report Mr. Chatterton was in charge of the pumping experiments. At the beginning of the year, there were eight Government engines at work or in course of installation, and during the year three more engines were installed—two at the Hagari Agricultural station and one at the Central Farm at Coimbatore. In addition to these, nine engines have been installed for private individuals for purposes of irrigation and others have been employed in pumping water or sewage for various Sanitary and Municipal bodies. There are also several engines owned by private individuals and installed by them without the assistance of the Government Department. The total number of engines at work or almost ready for work for irrigation purposes at the end of the year was 35. An expenditure of Rs. 21,908 was incurred by Government during the year under report on pumping experiments and the total charges since the commencement of the work amounted to Rs. 65,033. The convenience of oil-engines as a source of motive power has been sufficiently demonstrated, and the experiments so far made have proved that in several parts of the Presidency there is considerable scope for the employment of large numbers of engines and pumps provided the water-supply is sufficient and constant. As regards the cost of pumping, though the results obtained so far are by no means final, yet Mr. Chatterton is confident that with increased experience the cost will be considerably diminished. Loans aggregating Rs. 24,500 under the Land Improvement Loans Act were granted in seven cases during the year to private individuals for the purchase of oil-engines and pumps. The last two seasons having been of an abnormal character as regards rainfall and the water-supply in some cases having been much less than was anticipated, the collection of statistics regarding the duty of water as evidenced at pumping stations has not yielded much information of practical value. A set of boring instruments capable of boring to a depth of 50 feet was in almost continuous use during the year and the results obtained with it have been of considerable value as a preliminary to well-sinking. In the tract of country between Pondicherry and Cuddalore, artesian and sub-artesian wells are very numerous, and in the Coimbatore district where the wells are merely deep excavations in the partially disintegrated rock, valuable additional sources of supply have been opened by sinking boreholes. An oil-engine driving class was opened during the year at the School of Arts for the purpose of training boys and young men to look after oil-engines. The class is, however, not yet in a satisfactory condition owing to the difficulty experienced in getting a competent instructor.

28. *Meteorology.*—The rainfall registered at the various rain-gauge stations was tabulated as usual and the results published by the Meteorological Reporter to the Government of Madras. The total number of stations in the Presidency at the end of the year was 463 (inclusive of 75 in the Native States) or nine more than at the end of the previous year; and of these, 373 stations were inspected.

29. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction:—(1) Monthly season reports in three sections (rainfall, cultivation and prices of food-grains and salt); (2) Annual crop forecast reports; and (3) Quarterly reports of cattle mortality.

30. *The Madras Agri-Horticultural Society.*—The income of the Society from various sources, including the Government grant of Rs. 4,000, amounted to Rs. 20,648. The annual flower show was held on the 25th February 1906 at the nursery gardens of the Society and was on the whole up to the average of the previous years.

IV.—BOTANY.

31. A detailed report on the work done by the Government Botanist is appended. In connection with *Systematic Botany*, a fine collection of germination stages of *Ochlandra travancorica* was made in the Travancore hills and forwarded to Dr. Stapf at Kew. A special study was made of the Madras *root parasites* and their hosts; and a large collection of the *haustoria* of several species of trees was made in spirit for future work. An article on the sandal *haustoria* was also sent to the Editor of the

Agricultural Memoirs at Pusa. The flora of the Taliparamba farm received special attention, and a large number of peppers (*Piper nigrum*) were collected and worked out chiefly from the Nilgiris, the Tambracherry Ghaut and the Wynaad, the Palnis, and the Anamalais: collections of balsam (*Impatiens*), Gentians (*Gentianaceæ*), lemon grasses (*Andropogon Schœnanthus* and *A. Nardus*), etc., were also made and sent for authoritative naming. Attention was paid to the herbarium: about 4,600 sheets were mounted, of which the more important were 679 sheets of peppers and 115 sheets of balsams. In connection with *Economic Botany*, no special tour could be undertaken during the year as the time of the Government Botanist and his staff was occupied mainly with the work done at the agricultural stations under his control: and his more important contributions to Economic Botany have been noticed in section III. Under *Entomology*, an additional Assistant was appointed during the latter part of the year and deputed to Pusa to be trained by the Imperial Entomologist. Certain pests that affected a variety of crops such as sugarcane, ground-nut, indigo, cottons (both exotic and indigenous), paddy, pepper and cucumber were examined and remedies were also applied for the eradication of some of them, though with inconclusive results. Owing to the increase of agricultural work and other causes, little progress was made during the year in working out the life-histories of insect pests in the field, but it is hoped that this work will be vigorously pursued on the return of the additional Assistant from Pusa. Under *Mycology*, an Assistant was newly appointed and received preliminary training under the Government Botanist. Special attention was devoted during the year to a study of the fungus diseases which affected sugarcane, among other crops, at the Samalkota station and of the "*Tikka*" disease affecting ground-nut which assumed rather a formidable appearance in the South Arcot district. At the instance of the Imperial Mycologist, an attempt was made at inoculating healthy pepper vines of all ages obtained from the Wynaad with the fungus described by him as causing the current disease in the plantations, but the Assistant deputed by him for the purpose fell ill immediately after inoculating the vines and his services ceased to be available. The outbreak of disease in palmyras in the Gódávari district has already been referred to in section II *supra*.

V.—VETERINARY.

32. The detailed report on the operations of the Civil Veterinary Department is appended. The Madras Veterinary College worked well during the year. The teaching staff was strengthened by the appointment in January 1906 of a third lecturer. The students of the first and the second year classes did well at the annual examinations conducted by the Superintendent, Civil Veterinary Department, and *ex-officio* Principal, and all of them obtained promotion, excepting only one of the students of the latter class. A fresh batch of 30 students, instead of the usual number 20, commenced their term in January 1906. The students received instruction free of charge, and 30 of them (ten in each class) held scholarships sanctioned by Government. A hostel with boarding accommodation for 25 students was attached to the College during the year.

33. *Veterinary dispensaries.*—As in previous years, the establishment of Government Veterinary dispensaries at mufassal stations generally remained in abeyance during the year for want of local men qualified to take charge of them: a dispensary was, however, opened in the Bellary district in the middle of January 1906 by the Society for the Prevention of Cruelty to Animals. There were, besides this, five Veterinary hospitals at work in the Presidency, of which two were maintained by Government at Madras and Saidapet, two more by the District Boards of Trichinopoly and Madura and the fifth at Pithápuram by the Court of Wards. The dispensaries were well attended, and the number of in and out-patients treated was generally on the increase. At the dispensary attached to the Madras Veterinary College, horses and dogs formed the bulk of the patients, but there was a noteworthy increase in the number of cattle patients treated.

As local Veterinary graduates should become available from January 1907, Government provisionally sanctioned a scheme for the eventual establishment of 82 dispensaries (including those already established) as men and money become available, and submitted to the Government of India proposals for the reorganization of the

subordinate Veterinary staff which was to consist ultimately of 3 Deputy Superintendents, 15 Veterinary Inspectors and 132 Veterinary Assistants.

34. *Cattle disease.*—Preventive inoculation against cattle disease was continued during the year. The work was carried on in the districts of Ganjám, Gódávari, Kistna, Guntúr, Nellore, Bellary, Chingleput, Tanjore, Madura and Tinnevelly, and the total number of subjects inoculated against anthrax and rinderpest rose from 12,437 and 8,251 in 1904–05 to 22,152 and 12,689, respectively, in the year under report. The marked rise in the number of protected individuals is a very satisfactory feature of the year; and with the strengthening of the staff of Veterinary Assistants in the manner indicated in paragraph 33 *supra*, a steady and rapid development of this important branch of work may be looked for.

35. *Pony-breeding operations.*—Of the 14 stallions referred to in paragraph 34 of the report for 1904–05, two were sold and another was destroyed during the year under report. Four new Arab stallions were purchased in December 1905, so that the full complement of stallions (15) was maintained towards the close of the year. The three stallions disposed of during the year did little or no service, and those newly purchased commenced service only in February so that there were practically only 11 stallions at stud throughout the year. The total number of mares covered by these 11 stallions was 300 against 356 in the previous year giving an average of 27 mares per stallion against 25 in the previous year. Of the 356 coverings in 1904–05, the Superintendent has ascertained the results in 167 cases only; 52 cases were successful and in 115 cases the results were *nil*. The results are not traceable in 23 cases, and reports from Revenue officers are due in the remaining 166 cases.

Seventy-three entire ponies in the Coimbatore district and 31 in the Salem district were castrated against 63 and 16 respectively in the previous year. There were two deaths among castrated subjects and in one case compensation was paid to the owner.

36. *Pony and Cattle Shows and Cattle Fairs.*—No pony shows were held during the year. The Madras Cattle Disease Act (II of 1866) was put in force at most of the cattle fairs held in the Tinnevelly district; and at two of the more important of these, Veterinary Assistants helped the local authorities in carrying out the provisions of the Act. Cattle Shows were held at Anakápalle, Ongole and Pithápuram in the Vizagapatam, Guntúr and Gódávari districts, respectively, and Agricultural Exhibitions and Cattle Shows were held at Bellary and Tanjore. Government contributed Rs. 1,000 from Imperial and Rs. 500 from Provincial funds towards the prizes awarded at the Anakápalle, Ongole and Tanjore Shows, besides granting medals for the best cow and the best bull and certificates to all prize-winners. The results of the Ongole Show in its commercial aspect were more encouraging than in the previous year, as cattle to the value of about Rs. 42,000 either changed hands on the spot or were sold soon after its termination. Another special feature of this Show was the exhibition of a cow fed upon prickly-pear as well as the practical demonstration, by the owner, of the method of preparing this novel kind of fodder.

37. *Cattle-breeding.*—As stated in paragraph 36 of the report for 1904–1905, enquiries were made by the Superintendent, Civil Veterinary Department, in the neighbourhood of the breeding districts, with the object of providing selected persons with breeding bulls in the most congenial localities: and as the result thereof, seven young bulls of the famous Nellore or Ongole breed were purchased at the cattle show held at Ongole in the year under report and entrusted to breeders in seven villages situated in four taluks of the Guntur district, and orders issued for the submission of periodical reports on their condition by the Tahsildars and village officers concerned to their Divisional-officers. The results of the experiment will be carefully watched. The conduct of similar experiments in the vicinity of the cattle-breeding tracts of the Coimbatore district could not be undertaken during the year as owing to the unfavourable character of the season no fully-developed young bulls of the Kangayam and Alambadi breeds suitable for distribution as sires were available. Certain suggestions made at the first meeting of the Board of Agriculture held at Pusa in January 1905 for the improvement of Indian work and milch cattle were fully discussed, and the Board's proposals as to the general lines on which efforts should be made in this direction were approved by Government.

VI.—AGRICULTURAL EDUCATION.

38. Mr. Benson's suggestions for improving the method of imparting agricultural instruction to the minors under the Court of Wards at Newington, referred to in paragraph 37 of the previous year's report, were approved by the Court during the year; but the new arrangements were not given effect to before the close of the year.

39. *Higher education.*—The College of Agriculture continued to work under the revised curriculum introduced in the year 1902–03. In view of the contemplated abolition of the College (*vide* paragraph 7 *supra*) no students were recruited in January 1906. The number of students on the rolls therefore fell off from 58 in 1904–05 to 31 in the year under report. The College had to work without a Professor of Agriculture throughout the year; further, from the 22nd January 1906 when the Principal, Mr. Keess, went on leave, the Acting First Assistant was in charge of the College without prejudice to his duties as Lecturer on Veterinary subjects or to his supervision of the College Farm and Botanical Gardens. The results of the final examinations, however, showed an improvement as compared with those of the previous years—a result which was probably due to the revision of the curriculum in 1902.

The Veterinary Hospital attached to the College continued to increase in popularity, the total number of cases treated having risen from 1,232 in 1904–05 to 1,252 in the year under report: the number of bovine patients specially showed a large increase from 489 to 551.

The agricultural operations on the College Farm were affected by the unfavourable season. The oil-engine and pump worked successfully during the year.

The students of the College made two tours of agricultural study first in October 1905 in the South Arcot, Tanjore, Trichinopoly and Tinnevelly districts and the second time in January 1906 in the first-mentioned three districts and Madura.

VII.—THE PUBLICATION OF AGRICULTURAL INFORMATION.

40. The following bulletins were published during the year under report:—(1) No. 51.—Progress report on the work of the Samalkota experimental sugar farm during 1903–04; (2) No. 52.—The Agathi plant; its growth in connection with the cultivation of the betel vine, which is trained thereon; (3) No. 53.—The cultivation and curing of tobacco as followed near Dindigul, Madura district; (4) No. 54.—Note on Irrigation by pumping from a well at Melrosapuram; and (5) No. 55.—The great millet or sorghum in Madras. A note on sugarcane cultivation with special reference to irrigated delta lands was translated into Tamil and Telugu and copies of it were circulated with District Gazettes and distributed among ryots throughout the Presidency exclusive of the West Coast districts. Similarly, a note on the cultivation of the sunflower in South India was translated into the vernaculars and published in diglott in District Gazettes. The several Agricultural stations referred to in Section III *supra* were visited by a number of local cultivators to whom the object with which the stations had been established and the improved methods followed there were duly explained. As several of the ryots in the vicinity of the Koilpatti station applied to the Manager for a loan of the cotton-soil plough in use there, a second plough was purchased during the year and lent or let out on hire to those who desired to try it. Improving on the scheme reported on last year, under which selected ryots were trained at the Samalkota station, the Agricultural Department undertook during the year under report to give practical training at one or more of the Agricultural stations, for a period of six months or one year, to specially selected apprentices deputed by the Central Agricultural Committee, by District and Branch Agricultural Associations and by private gentlemen. As in the previous year, an Agricultural Inspector was occasionally deputed to help the Tanjore Agricultural and Industrial Institution, and the Deputy Director of Agriculture also visited the district and helped the members of the Association with advice in the conduct of their "Co-operative field experiments". An Agricultural Inspector was also placed at the disposal of the Penukonda Agricultural Society with a view to inspect the sugarcane plantations affected with disease in the Hindúpur taluk and help the ryots with advice as to the remedial measures to be adopted for the eradication thereof.

41. Copies of the Industrial Monograph on "Tanning and working in leather" were distributed during the year to the various Agricultural, Planters' and Trades' Associations and to Editors of newspapers. Further, vernacular translations of the abridged Monograph were circulated with the District Gazettes and spare copies were also distributed amongst tanners and leather workers. The Industrial Monograph on "Stone Carving and Inlaying" due in September 1905 was submitted to Government after the close of the year under report. The subject chosen for the Industrial Monograph for 1905-06 is "Carpet making", and Mr. Thurston, Superintendent, Government Central Museum, has been instructed to prepare it with the co-operation of Mr. Chatterton. It is not, however, due until September 1906.

42. The number of papers received from and communicated to other Provincial Departments was as follows:—

	Received.		Sent.
	Indian number.	Foreign number.	Number.
Total publications	395	751	17

APPENDIX I.

ADMINISTRATIVE REPORT ON THE AGRICULTURAL STATIONS UNDER THE CONTROL OF THE DEPUTY DIRECTOR OF AGRICULTURE.

I have the honour to submit the following half-yearly (annual) report on the work entrusted to me. Hitherto since my appointment was placed in its present position, no such report has been prepared or called for; whilst formerly the report of my work was embodied in the general administration report of the department. In accordance with the orders of the Government of India, the mass of detail which it is not advisable to publish generally, but which should be printed in a handy and convenient form for departmental and expert use, is omitted from this report and may be got ready later on in, say, July or August next.

2. *The Bellary farm.*—Though the character of the season was reviewed in my report No. 2671 (*a*), dated 28th October 1905, it is necessary to repeat and complete the remarks then made. Though the rainfall of the first six months of the year was on the whole favourable, it presented some characteristics which detracted from its value. There was an unusual fall of rain during the latter half of April which was of no practical value, but rather injurious in moistening the soil and so preventing the destruction of weeds. May was practically rainless except for light showers which had no effect under the high temperatures then prevailing, and though there was a heavy fall early in June, this was followed by almost entirely dry weather for nearly two months and thus the sowing of early crops was prevented. During the latter half of August there was good and ample rain and this was taken full advantage of in sowing korra (*Setaria italica*) with cotton, several sorts of sorghum (some of which however should have been sown earlier) and finally cotton alone on the areas set aside for these crops. These, the major part of the sowings on this farm, were fully a month earlier than those of 1904, but after the burst of rain alluded to there was a serious period of drought during September (which is usually the wettest month of the year at Bellary) and under it the newly-sown crops languished. A fair amount of rain fell during the early part of October, but later there ensued an almost entirely rainless period, except for one shower in January too late to be of any value, which most seriously affected all the crops. Had anything like the usual rain fallen during the latter half of October and November, the prospects of the farm would have been very good. As things were, the crops suffered, first from the dry period in September and again from the drought of the later months. This was especially the case with the korra and sorghum crops, and the crop of the latter late variety, which is the chief cereal crop of the farm, was very light in consequence. The cotton crops suffered least and when it is possible to prepare a complete report regarding them this will appear, although these too suffered a good deal and instead of a bumper yield only a moderate outturn was obtained. This crop also suffered considerably from attacks of insects.

Particulars of the rainfall will be given in the "scientific report" of this station.

3. *Cultivaton.*—The whole of fields Nos. 2 and 5 were thoroughly broken up with the cotton soil plough and the two plots of the tillage series of experiments were worked with a country plough, but otherwise the tillage was carried on with the *Gorru* and *Guntaka* of the locality, except in the case of a small area under the well where a Swedish plough was used. Sowings were almost all made with the local drill (*gorru*) and its attachments and after cultivation with the local bullock-hoe (*dantelu*). Thus, as far as tillage is concerned, the practice of the neighbourhood was almost altogether followed. More work was however put into the land than is customary and the improving state of the farm bears evidence to this work. Great benefit to the cotton crop was experienced from the amount of "after cultivation" put into it; in fact, in the face of the long drought, it would have fared badly, but for this. For manure, a large purchase of horse manure from the cavalry lines in the previous year had been composted and was used during the season; whilst in another field a considerable amount of poudrette, accumulated in previous years by the Bellary jail, was obtained and applied. The night-soil from that jail is now being taken by the farm and trenched on the small area of irrigable land there is. In the experimental field for cotton, a variety of manures were applied the results of which will be recorded separately, as it is most inadvisable to publish the results of a single year's trials.

As noted in my report of October last, the series of tillage experiments in field No. 3 were continued, though no deep tillage was performed on any of the plots there during the year. The outturns obtained from the several plots present, as is so often the case with field experiments, considerable discrepancies which it would serve no good purpose to discuss here, but I must note that the clearly marked effect of the previous season's deep tillage on the standing crop, to which I alluded in that report, was not exhibited in any very clear way when the test of the scales was

applied. And I mention this because it shows how carefully impressionist reports must be examined when they deal with practical agriculture. So far as the figures of the year go they appear to indicate a slight benefit from the previous deep tillage in the case of the grain crop, but that in the case of the cotton crop the superficial tillage with the country plough performed during the year gave slightly better results. On the other hand, the yield of cotton from the plots treated with the *gorru* and *guntaka* for the whole period of these experiments was much below that from either of the other plots and yet in the case of the grain crop these plots yielded better than those worked with the country plough and not much less than those worked in the previous season with the cotton soil plough.

4. *Manuring experiments.*—Under the recent orders regarding the preparation of these reports, it is not necessary to discuss here the experiments in the methods of collecting cattle manure which have been continued on this farm. As stated in my report already quoted, the collections were made on the three systems adopted in previous years and applied to the identical plots manured in the previous years. Although a new pit was made for the collection of the manure and it was provided with a shed over it, this has not proved altogether successful in securing the satisfactory decomposition of the collections. The manure in this pit lost a most extraordinary amount of nitrogen and phosphoric acid, whilst in the manure heaped in the open, to which the urine of the cattle was not added, the proportion of nitrogen and potash was unduly high. The portion of the field No. 2, where these manures were applied, was sown with korrapatti (Italian millet two rows and cotton one row) and came up well; but the whole suffered much from the unfavourable season. Bearing in mind the previous history of the plots to which these collections were applied, it would serve no useful purpose to discuss the results here, and it would demand far more space than could be given to the matter; but it may be stated that, on the average of the two plots now manured with these collections for three seasons successively, the box manure gave much the best results so far as the korra crop was concerned and the worst for the cotton crop; whilst the best yield in the case of the latter crop was obtained from plots to which no manure has been applied during the whole period.

In the field where these collections were applied, plots to which the following manures were applied, were included during the year; these plots having received no manure in the previous years:—

Plots 4 *and* 7.—Oil-cake, at 1,000 lb. per acre.
Plots 6-*a and* 11-*a.*—Saltpetre, at 300 lb. per acre.
Plots 6-*b and* 11-*b.*—Superphosphate, at 300 lb. per acre.

The design in this case is to test the value of these manures on cotton grown in rotation, it being remembered that the great deficiency of the Bellary farm soils is in nitrogen and phosphates. Particulars of the results as well as the quality of the manures used will be recorded in the "Scientific report" of the farm to be prepared later on; but here it is sufficient to state that the oil-cake gave better results than the box manure even in the case of the grain crop and the saltpetre a material increase on the unmanured plot, but the superphosphate showed no effect at all. In the case of the cotton crop, however, whilst the saltpetre plot showed a small increase over the unmanured, both the superphosphate and cake plots showed the smallest yields of the whole series.

Alongside the above series, another has been started to test the effects of manures on cotton, that crop being grown continuously for a period of years yet to be determined. The series is as follows:—

Plots Nos. 13 *and* 19.—Oil-cake, 1,000 lb. per acre.
Plots Nos. 14 *and* 20.—Superphosphate, 300 lb. per acre.
Plots Nos. 15 *and* 21.—No manure.
Plots Nos. 16 *and* 22.—Oil-cake, 1,000 lb. + superphosphate 300 lb. per acre.
Plots Nos. 17 *and* 23.—Saltpetre, 300 lb. per acre
Plots Nos. 18 *and* 24.—Basic slag, 300 lb. + saltpetre 200 lb. per acre.

The cotton was sown in rows two feet apart and the seed used was some specially obtained from one of the best cotton-growing villages in the district, and is believed to be superior to the stock previously worked on at this farm. The sowing was about a fortnight after that of the mixed crop alluded to above and though a remarkably good stand was obtained and it grew well in its early stages, it suffered a good deal from the shortness of the rainfall in the later season. Although every possible precaution was taken in laying off and arranging the plots to secure uniformity, the results obtained are very discrepant and seem to indicate that none of the manures had any effect on the yield during the season under report. One year's results are of course of little value alone, but the almost entire absence of effect may in part be due to the lateness of the manuring and especially to the deficiency of the later rains.

5. *Cotton.*—The series of experiments proceeding with this crop can only be dealt with later on and may then be stated in detail. It included two separate lines of work—one the endeavour to improve the stock worked on in previous years on the farm by selection and crossing, mainly *inter se*, and secondly the experimental growth of some sorts found in the ryots' fields which

appeared to be worth attention or which needed more accurate and continuous observation than is possible in such cases, in order to determine what they were and their value. On the first line of work, besides the large main area of the farm sown, as already noted with Badnehal seed, there were 12 plots sown with different strains of cotton raised and selected on this and on the Koilpatti farm in previous years with a view to further selection and crossing. Some of these did fairly but not well on the whole. Of the produce of the crosses of the two previous seasons, 36 plots were sown, most of them naturally very small ones and whilst in character of growth these crosses have come on true to type, it remains to be seen how the lint turns out. In a few cases, the yield was very poor, but in a majority it was decidedly an improvement on that obtained from the uncrossed strains. In some of the most promising strains, the growth of the plants showed an astonishing vigour, and if illustrated with photographs this report might convey a wonderful impression of the progress and success of the work. These plots, however, suffered a good deal in February from attacks of aphides and also from boll-worm. The plants were most prolific and as they also developed an amount of branches never or seldom to be seen in "Westerns" cotton. Had it not been for this and the unfortunate character of the latter part of the season, some phenomenal yields would have been obtained. The work being done was inquired into by Professor Gammie, the highest botanical authority on Indian cottons, during December 1905, and it is a pleasure to be able to record the fact that the work I have been carrying on for the last three years was fully endorsed by him as being on the right lines.

On the second line of work mentioned above, plots were sown with cottons of eighteen different strains collected in the early part of 1905, besides a plot of half an acre with "Bombay" cotton —which is probably "Dharwar Americans"—and some Peruvian and a small quantity of the much-vaunted Caravonica cottons. The eighteen sorts first mentioned were nearly all either "Northerns" or "Westerns," that is to say, the seed was found in the areas which the trade depends on for these sorts; but in some cases they merely showed evidence of ill-directed introductions in former years and in others no peculiarly valuable characters, though it is still too soon to pass a final verdict as to whether it is of any use to continue their growth on this farm. With the starting of the Nandyal farm during the current year, all work in connection with the strains falling into the group of "Northerns" will be transferred to that place. The "Bombay" cotton flourished fairly, but the outturn was not satisfactory, still I am not certain whether or not to recommend a continuance of the work with this sort. The Peruvian, the seed of which was received from a firm in England two years ago, has proved a failure and the Caravonica done no good whatever. The seed of the latter was very poor and, though raised with care and tended assiduously, the plants made no growth on the soil of this farm. The growth of these latter varieties is not, however, an important item of the objects of the farm and will scarcely demand further notice.

6. *Sorghums.*—These are normally the main cereal crop of the locality, but owing to the exceptionally favourable opening of the season in August a much larger area of "korra-patti" was put down than usual, whilst all the late sorghums suffered most severely from the deficiency in the later rains. This is a very serious matter in Bellary where the late sorghum crop is the main fodder crop and a failure of this exhausts the reserves which it is customary to maintain. The comparatively late time at which the rains came also prevented the sowing of any of the earlier sorts of sorghum on the farm and nothing satisfactory was possible in reference to them. Of the early sorts, plots of fourteen varieties were sown from seed selected in previous years, but the conditions were such as not to allow of any conclusions being drawn as to their respective values and effort was concentrated on securing the best possible supply of seed for next year. In the same field six sorts of Bombay fodder sorghums were sown with very similar results; but from another small trial under irrigation it appears that the "nilwa" and "sundhia" varieties of fodder sorghum, which have such a reputation in Western India, maintain their reputation at Bellary and especially the former, though the latter is the quicker grower.

The farm crop of late sorghum—the local *bilai jola*—was a poor one for the reasons already stated and nothing further could be done in the way of improvement by selection. And here I must note that, except in the case of some visitors from a distance to the Bellary exhibition, there was little or no demand for the farm-grown seed of the previous year. The ryots admitted the excellence of the sample, but said "why should we buy it? We have our own seed which we carefully gathered at the threshing floor and it is quite good enough for us!!"

7. *Paspalum dilatatum.*—This fodder grass does not flourish on the soil of the farm. It will exist if watered from time to time, but it even then comes nowhere near the sorghums as a fodder plant, and it is most improbable if it can stand the long dry season without water.

8. *The Koilpatti farm.*—Again a certain amount of repetition from my report already quoted is inevitable. As stated therein, although the rainfall of April was as a whole good, it was distributed in several showers, and as it followed on a season of remarkably short rainfall or rather of such an early cessation of the usual rains, it was insufficient to stimulate any late crop of cotton or to help out the low supplies in the wells. The rainfall of May and June was very light, and in July there was practically none and in August also very little. Altogether up to the middle of September no real relief from the drought of the previous year was experienced and the deficiency in the supplies in the wells retarded the customary planting of the ragi crop, etc., whilst little could be done towards the sowing of any early crops on the red soil. This long dry weather was, however, fully utilized in breaking up a large portion of the black soil area with a view to cleaning it

thoroughly and in carting tank silt on to the red soil for its improvement. Of the latter, 2,160 cart-loads were carried during the season and there can be no doubt that the land of this portion of the farm is gradually ameliorating.

The later rains from October onwards usually represent about three-fourths of the total fall of the year, and although the average amount was received its distribution was extremely bad. Half the total fall at the season was received during the first half of October, and this was followed by a spell of dry weather for about 25 days and this by an excessive downpour for about 4 days in the latter half of November. From 26th November till 6th January no rain fell and then only a light shower, and this was followed by another fortnight of dry weather with only a little rain at the end of the period, and then no more up to the end of the year. Altogether though the total fall was not much to complain of, the vicissitudes of the season were severe and unfavorable. Particulars of the rainfall will be given in the detailed record of experiments made in the farm later on.

9. Besides the application of tank-silt mentioned above, the improvements made include the deepening of one of the old wells on the red-soil block, which however has not proved a success as the rock is extremely hard and impervious; and the sinking of a well in the black soil area where a strong supply has been met with, which may be further developed in the future and as it is in the centre of the block, now extended, it will be most convenient as a place for subsidiary buildings, the erection of which will be a source of economy in labour. In this part of the farm, the portion previously liable to surface wash is being gradually brought into shape and levelled down by cattle labour as opportunity permits. In order, if possible, to improve the water-supply of the red-soil area, an exploration by boring was made during the year of some land just outside the farm area with fairly promising results, but these operations need to be carried further before any final decision can be arrived at in the matter. If a good supply is found, this block can be easily brought to a high state of cultivation.

10. Pursuant of the policy urged by the Board of Agriculture, that, where cotton farms are started, they should be made large enough to produce a really useful quantity of seed before it is distributed into the hands of even selected ryots, proposals for extending the cotton-soil area were made during the year and accepted during the month of March, when the land, which brings the total area of cotton soil to about 100 acres, was acquired; but it was not handed over to this department, until after the close of the year. The permanent retention of the farm having been decided on, the fencing of the red soil block and the erection of a seed-store, rest-house and probationer's quarters were sanctioned, but only the latter work was begun as the plans and estimates for the others have not yet been received from the Public Works Department. The provision of these facilities will all tend to better work and efficiency.

11. No late crop was obtained from the cotton standing at the end of the last official year, but as the whole of those operations has been made the subject of a special report, it is unnecessary to allude to them further here.

12. Cultivation on this farm is carried out by the combined use of the ordinary plough of the locality, the implements in common use in the Ceded Districts, certain patterns of small iron ploughs which are found most useful, because so expeditious, under certain conditions, and last, but not least, so far as the black soil is concerned, the heavy cotton soil plough made by Messrs. Massy & Co. on lines suggested to them many years ago by me, which has been found so successful in the Bellary district under somewhat similar conditions of soil. With this last-named implement, a large portion of the cotton soil of the farm was broken up during the year, and the result in improved cleanness was very marked and I am satisfied, after several years' effort, that this result would not have been attained if the ordinary tillage practice of the locality had been adhered to.

And here it is appropriate to mention the fact that the use of this plough which, with other patterns of heavy iron plough, is now in common use in the Bellary country, as the result of the combined efforts of the late A. Sabapathy Mudaliar and this department, having been brought to the notice of the local cultivators by its having been used on the farm during 1904 and 1905, has now made a step further towards its introduction. Several persons last year applied for the loan of the farm plough to try it on their own lands, and as that was not possible a second plough was purchased and lent or hired to those who wanted to try it. The information obtained as to the results of these efforts is on the whole satisfactory and now it remains to be seen whether and how soon the Tinnevelly cotton soil ryot will move on, as the Bellary ryot has in the last quarter of a century, and purchase these implements for himself. So far as the farm is concerned, what has to be done in the future is to continue to let out a plough to those wishing to try it, and possibly to set up a workshop later on for the purpose of repairs and the sale of parts, etc.; but possibly, if it grows into a reality, the District Agricultural Association may undertake this as they might a good many other lines of work.

The trials commenced with a view to testing the value of deeper tillage than is customary as a prophylactic against drought were suspended during the year as the land set aside for the purpose could not be brought into proper condition with the ordinary tillage of the locality. It can be renewed next year.

13. The experiments designed to test certain methods of conserving cattle manure, to which allusion has been made in referring to the Bellary farm above, are duplicated on this farm and were continued during the year. So far as collection goes, there were discrepancies in the

results, as revealed by analysis, that cannot be easily explained; whilst it must be sometime yet before the outturns of the plots, of cotton, to which the manures were applied can be known in full.

As at Bellary, the scheme of manuring was extended in this series during the year and two sets of plots were added which were manured as follows:—

Plots Nos. 3 *and* 6.—Oilcake 1,000 lb. per acre.

,, *Nos.* 4 *and* 14.—Superphosphate 200 lb. + saltpetre 300 lb. per acre.

The field to which these manures were applied was cropped in the usual rotation with cotton during the year.

Another series of experiments, which it is proposed shall be continued with cotton grown continuously on the same land from year to year was laid down and started in the adjoining field in plots each measuring one-tenth of an acre. They were manured in the past year as follows:—

Plots Nos. 1 (*a*) *and* 5 (*a*).—Oilcake 1,000 lb. per acre.
,, *Nos.* 1 (*b*) *and* 4 (*b*).—Superphosphate 300 lb. per acre.
,, *Nos.* 2 (*a*) *and* 5 (*b*).—Saltpetre 300 lb. per acre.
,, *Nos.* 2 (*b*) *and* 6 (*a*).—No manure.
,, *Nos.* 3 (*a*) *and* 7 (*a*).—Oilcake 1,000 lb. + superphosphate 300 lb. per acre.
,, *Nos.* 3 (*b*) *and* 7 (*b*).—Saltpetre 200 lb. + superphosphate 200 lb. per acre.
,, *Nos* 4 (*a*) *and* 6 (*b*).—Saltpetre 200 lb. + basic slag 300 lb. per acre.

The results of these applications will only be known at the end of the season, but it must be remembered that the past season was not favourable to obtaining any marked results and that from such experiments results must not be looked for in a hurry.

14. The chief crops to which attention is given on this farm are cotton, cumbu (*pennisetum typhoideum*), and certain peculiar or local sorts of sorghum, the growth of which is, for the most part at any rate, confined to the southern districts of the Madras Presidency. Other crops are grown as incidents of cultivation and to make use of the land available. With cotton, 12·75 acres in all were sown, and the crop is still standing so that the work done therewith must be made the theme of a later report. Following up the work of the past, it was possible to sow considerable areas with uppam and karankanni cottons separately, and a supply of a new stock of the former sort was obtained and sown separately. Besides this, the produce of the crosses made in the previous years has been further propagated and the work of selection both for early yielding and for prolificacy has been carried on. The Cambodia cotton to which allusion was made last year was grown on a larger area but neither in this nor in the case of the other experiments with this crop would any good purpose be served by further reference thereto at present.

15. With cumbu, 7·2 acres were sown, of which rather less than a half was sown with the local variety. This was got in rather earlier than the foreign sorts and did rather better, but it too suffered from the early cessation of the rains and yielded only 1,057 lb. of grain. The foreign (Guzerat) sorts sown were Nadiad, Bhavanagiri, and awned, and none of these did well under the seasonal conditions experienced. The Nadiad kambu was the worst and yielded only 47 lb. of grain per acre, thus for the second year proving unsatisfactory. The other two varieties started well, but were checked by the dry weather that set in in December and they yielded only awned 206 lb. and Bhavanagiri 166 lb. per acre. These two varieties, however, are well worth further trials, and the awned especially.

16. Fodder sorghum was grown as usual, but in the state of the season it was not considered worthwhile to repeat, during the year, the experiment in cutting the crop at different stages as was done in 1905.

The growth of the irungu varieties of sorghum, for the purpose of their proper botanical identification and study, was continued and the results obtained will be recorded later on. It is sufficient to say here that now enough seed has been propagated by "sorts" to allow of field tests of the varieties being made; some of the sorts appear to be decidedly superior to the others. No further botanical study of these varieties was made during the year and it will be desirable to transfer all that class of work to the Central Institute in future, as the Principal of that institution will have the necessary aid of specialists in such work.

17. The propagation of seed of the varieties of paddy named banko and halki was continued on small areas with results less favourable, but not unsatisfactory in the case of the former, which with 29 acre-inches of water gave 1,700 lb. of grain per acre. The halki variety gave only 929 lb. per acre with 33 acre-inches of water; but it is possible that the latter was not planted quite as closely as may be desirable for it. The banko paddy seed that could be spared was all eagerly taken up.

18. *Paspalum dilatatum.*—A small plot of 0·125 acre was planted out with this grass, which has a reputation in Australia as a drought resistant fodder plant, the sets being placed two feet apart in either direction. It struck well and stooled considerably and between April and October, gave in 5 cuttings 3,030 lb. of green fodder. The plot was then extended by sub-dividing the stools to an area of 0·45 acre and during December one more cutting of 864 lb. was obtained. Owing to the want of water, the crop could not be irrigated regularly, and in fact designedly one half of the extended plot has not been watered at all since it struck root. The evidence so far

available is that the grass will not, on a light soil, withstand an ordinary hot weather, and though it will yield fairly if tended carefully and frequently watered, this is not enough to establish it as a valuable fodder plant for ordinary cultivation.

19. *Sweet potatoes.*—The varieties grown in the previous year were again propagated on a small scale and a trial made of the effect of lifting the vines to prevent their rooting, which is not always done, and the results show that there is some small advantage from this practice. At the same time, a trial of the advantage of planting the vines in flat-beds and on ridges was made, and this also showed some slight advantage from the former method, but I am not inclined to attach great importance to these results, as the season was exceptional and the water supply bad. So far as could be roughly determined, it was found that the flat-bed plot required a little more water than that ridged, but here again the exceptional state of the supply renders conclusions difficult.

20. *Ragi.*—Of this crop some 3·14 acres irrigated under wells was grown and the crop did fairly. With this crop the test of the ridge and flat-bed systems was continued and though the conditions were not favourable to a satisfactory record, it is worth noting that again the advantage appeared against the former. The yield obtained on the ridge system was 2,588 lb. per acre with a consumption of 3,249 c. ft. of water for 0·27 acre, and 2,370 lb. per acre for 3,460 c. ft. of water for a similar area on the latter system.

21. Chillies were, as usual, grown under the wells, but the early exhaustion of the water-supply led to a comparative failure of this crop and what was obtained was due to careful attention to intercultivation. With the chillies a few plants of several varieties of tobacco were grown with the object of producing seed true to variety and to this end the flower heads were protected from insects. A few sorts of American tobaccos were included amongst these varieties, and of these one sort, Kentucky white burley, attracted a good deal of local attention on account of the size and weight of its leaf. It may be further grown next year.

The attention which has of late been given to the so-called jute of the Northern Circars and the fact that the plant producing it is found growing in gardens throughout the Presidency, led to the sowing of a little *Hibiscus cannabinus* with a view to obtaining seed of the two kinds that are commonly mixed together and this seed can next year be sown with a view to making a variety test of this fibre plant.

22. The year under report was signalised by a beginning in the way of extension. The lines of extension which it is decided to follow are those long ago recommended by the Agricultural Committee of 1889, to start a farm in each separate agricultural tract, and also another of wider scope and design as a central institute for research and teaching for the Presidency as a whole. The selection of a site for the latter near Coimbatore engaged me for a large portion of June 1905 and my selection was accepted in July by the Director in company with a number of other officers. As soon as this selection had been approved by Government, steps for the acquisition of the land (some 450 acres including 46 acres of wet land and a considerable area under wells) was proceeded with, but it was not until February last that any steps could be taken to attempt to bring the land into form or to equip the farm for the current year's work. Most valuable time was lost, and what could be done was greatly hurried in order to get it finished within the financial year. What was possible was to erect temporary shedding for the cattle and other farm purposes; to purchase enough working cattle for the farm, in which I desire to note the great help given me by senior Veterinary Assistant V. P. Subramania Mudaliar; and to gather together the implements and tools most urgently required for the farm. Up to the end of the year, but little of the land required, except that portion which will for the most part be required for building purposes, had been handed over to this department, so that but little progress towards framing designs for laying out the farm for its future uses was possible and this work was further retarded by the fact that it has been decided to obtain some new officer to be Principal of the Institute.

Besides the above, designs for the Institute buildings were prepared by the Government Architect in communication with myself, the Government Botanist, and, I must note, in so far as the accommodation on the chemical side is concerned, with the advice most freely given of Dr. Lehmann, Agricultural Chemist to the Government of Mysore. Designs for the farm buildings were made and estimates for their construction were afterwards drawn up and have been handed over to the Public Works Department, whilst designs for the necessary residences for the staff first needed have been prepared, and a general scheme for the arrangement of the buildings made out. An exploration for the water-supply of the Institute was begun under Professor Chatterton, but could not progress far owing to unexpected difficulties, which have since been got over.

What the farm needs at present is that the officer who is to be Principal of the Institute should go into residence thereon, and work out his own ideas. This he will not be able to do for some months to come owing to the delays which have arisen over the acceptance of a plan for the rest-house which is needed for his accommodation at first. That is not likely to be ready for another three months or so.

23. Besides the Central Institute farm, another large farm was opened during the later months of the year at Hagari, about 9 miles east of Bellary, which is intended to deal with problems connected with the irrigation of *paddy and cotton* on the black-cotton soil which forms so large an item in the area commanded under the great Tungabhadra irrigation project. A much larger area than will be required for this comparatively limited scheme of work was taken

up under the idea that the scope of the experiments would include the whole question of utilising water on black-cotton soil. It amounts in all to 225·16 acres exclusive of sand dunes along the river side. As some of the land was still under crop until the end of March, the whole area was not handed over to this department until the 30th idem; but prior to that date a commencement was made towards bringing the land into a proper state, by breaking up the worst of it in the usual fashion of Bellary with the cotton soil plough. At first, work had to be done with hired teams, but during March a beginning at stocking the farm was made and cattle were purchased, then and later, sufficient to afford three full teams for such ploughs, and all the implements essential to immediate requirements were obtained. Temporary sheds were run up for the cattle and an officer placed in charge to conduct the preliminary work. Before the end of March 43·37 acres of land had been broken up and since then the work has progressed steadily.

This farm is to be irrigated by pumping from the bed of the Hagari river and an installation is being set up there to provide the water, it being intended to simulate as far as possible the conditions under which water will be ultimately supplied from the Tungabhadra. In one detail, it is hoped that it may be possible to simulate the conditions under which cotton is irrigated in Egypt, and though it is understood that that system is, in Egypt, being abandoned as far as it is possible to do so, it is proposed to try to grow cotton under 'basin' irrigation. For this purpose, three small basins are under construction which will be filled whenever a freshet in the river affords a chance of obtaining water charged with silt.

The necessary farm buildings and quarters for the subordinate in immediate charge of the farm operations were designed, and their erection under the supervision of Professor Chatterton was sanctioned.

For this farm too what is required is a European officer in continuous, and almost daily, charge, as the problems to be solved are novel and it is only by continuous observation and power to adapt action to conditions as they arise that those set out are likely to be solved. I was able at the last meeting of the Board of Agriculture to enlist the co-operation of Dr. Leather and Mr. Fletcher, Deputy Director of Agriculture in Bombay, who has had some experience of Egyptian agriculture towards the work, but as yet it has not been possible to obtain any help or advice from those officers.

24. Another station, the starting of which was sanctioned during the year, is that at Attur, about 3 miles from Chingleput on the banks of the Pálár. At this place a pumping installation had been set up with the object of showing how the underground river that runs in the bed of the Pálár might be tapped and utilised by pumping, and the question was raised as to how the land attached to this pump might be utilised for experimental purposes. I suggested that it might possibly be used for experiments in the growth of exotic and perennial cottons under irrigation and for the growth of fruit trees, with the special aim of studying the methods of dealing with fruit for export and the like. To this has been added the study of fodder crops for the locality. The starting of this farm only came under discussion late in the year, and partly for that reason, and partly because the well originally sunk for the pump proved a failure, in so far as the idea with which it was dug is concerned, but little was possible towards the actual commencement of the work. A small grant was made on 23rd October 1905 to enable me to sow the seed of a number of sorts of cotton, but this was given so late that the crops have not done well; a result also in part brought about by the fact that the soil of the only portion of the farm land that is commanded by the pump as it now stands is exceedingly poor. The actual sanction for starting the farm was not received until 10th February 1906 and efforts were made to provide within the financial year its equipment and materials for the buildings that will be needed for the most part successfully. The area of the farm is 66 acres, of which a major portion was immemorial waste. The removal of the prickly-pear and rank vegetation growing on it was taken in hand, and about 55 acres have been cleared for cultivation. Otherwise there is nothing particular to record regarding this station.

25. On a representation I made that it was advisable to provide a station for studying "Northerns" cotton in the country where that trade variety is produced, and for propagating pure seed thereof—the crops now found being in an almost hopeless state of admixture owing chiefly to ill-advised introductions of other kinds,—and in due course for the improvement of this sort by selection and crossing, sanction was granted towards the end of the year for the acquisition of the land required at first for these purposes near Nandyal, the site having been selected in August last. Nothing further than this was possible in respect of this farm during the year, but it should be mentioned that besides the work with the local cotton mentioned, it is proposed to devote attention here, as at the other farms, to the great question of the proper manner of conserving cattle manure; to the deeper tillage problem; to the sorghums of the locality and their improvement; and to the possibility of introducing some new sort of indigo which may be sufficiently remunerative to induce the ryots to continue the cultivation of that crop.

26. The experimental plantation of agaves at Hindupur was maintained and a number of suckers collected into nurseries with a view to its future extension; but, though the Government towards the end of the previous official year expressed the wish that certain points regarding the cultivation of these plants should be tested experimentally, it was not found possible to do anything in the directions adverted to. The plantation does not need drainage; the comparative growth under shade and in the open cannot be properly tested on this plantation owing to the

absence of shade; nor was it possible to do anything effectual towards testing the comparative value of clearance of only the large growing plants and thorough weeding, etc., as when the orders were received the whole place had been cleared out, but one portion of the plantation has since then been left to nature and the results may be observed hereafter. Owing probably to the thorough clearing out of the plantation, especially on the side near the railway line, it did not suffer from fire during the year, but otherwise no marked change appeared. The growth remained as irregular as ever, but from a number of well-grown plants the leaves were cut, and these yielded on hand-scraping the satisfactory rate of 3 per cent. of fibre, the rate varying from 2·5 to 4·3 per cent., that from the leaves of the older plants being the greater. The fibre was very favourably reported on, but the cost of preparing it by hand at Hindupur was found to be prohibitive. This latter point is a matter for further trials, and it should be possible to work more cheaply. The question of extending this station to a really effective area for experiment is at present suspended owing to other more pressing calls on the time and staff available.

27. The alkali land experiments being conducted at Terkuteruvu, a place most inconveniently chosen some thirteen miles from Madura, under the influence of the Periyár irrigation, were continued under the supervision of the local officers of the Public Works Department. Inspections made during the year and recent analyses of the soils of the plots taken under treatment show that the chief defect therein has been, for the most part, removed by the drainage and tillage which these plots have undergone. These results would have probably been attained much earlier had the land been properly fenced at the commencement. This fencing has now been put up and what these plots now need is chiefly good cultivation. Some of the plots yielded fair outturns last season, and arrangements have been made for the continuance of the experiments during the current year.

In the same district advice was given to a number of private individuals as to the reclamation of similar land, but it is not yet known what action they have taken in the matter.

Advice on similar problems has been sought by, and as far as possible has been given to, persons owning alkali land in other parts of the Presidency; but such work is sadly circumscribed by the fact that I have not yet received the help, which Government long ago asked for me, in the form of an Agricultural Chemist.

28. In the later months of the previous official year, notwithstanding the fact that the season had been most unfavourable to the crop, it was decided to attempt some experiments in curing tobacco at Dindigul with a view to turning out a higher class of leaf than is secured under the ordinary practices of that centre. To this end the co-operation of Messrs. Spencer & Co., the Cigar Manufacturers of that place, was sought, and was most cordially given, and a certain quantity of the produce of three different tobacco gardens of no great repute was purchased, and handed over green to that firm for drying and curing. Curing was carried on both in shade and in the open as usual; but the arrangements possible in this initial experiment were far from perfect. A final report from independent experts on the leaf cured has not yet been received, but it may be stated that the appearance of the leaf was surprisingly good, and samples laid before the Board of Agriculture at Pusa in January last attracted much flattering attention. It should also be noted that in the case of the leaf from one garden which had a reputation for burning with a black welt at the end of a cheroot, the burning was perfect. So far as I can personally judge the result as to flavour was not altogether successful, but that difficulty can be got over as experience in fermentation is secured. What is clear is that, in every season and with each crop, the processes may need modification, and local experience is one of the most important requirements in curing tobacco. These experiments are now being repeated by the same firm, but the conditions of the season just over were even more unfavourable than those of 1905. The tobacco crop, however, demands much study from other points of view besides curing, and in these the help of the long-expected chemist will be required.

29. In the districts of Bellary, Kurnool, Anantapur, Kistna and Tinnevelly an attempt, begun in haste in the previous year, to collect the seed of superior crops of cotton, was carried through as far as possible. The operations were conducted on a considerable scale in the first two, and the last named district, and for the most part the seed was collected by direct agency of the staff of this department. In Tinnevelly the assistance of Messrs. Harvey Brothers was sought and freely given in the purchase of seed, and the department is greatly indebted to the agent of that firm at Virudupatti for much aid and advice in the matter. The seed collected was not however very freely purchased by the ryots, though in this respect better results might have accrued had the sales been begun earlier, and had it been possible to issue the seed on credit. So far as enquiries have been possible, the purchasers of the seed collected have been more than satisfied with the results, and if the operations can be repeated, they should be more successful in this respect, whilst the sale and distribution of such seed is a thing which might well be undertaken by the newly-organised Agricultural Associations in the districts where the collection of seed may be possible, and is advisable at present. Nothing that is likely to really affect the quality of the produce is, however, in most localities, likely to come of such operations, unless and until it is possible to arrange for growing pure and good seed specially, and this can only be properly started by opening seed-farms after the initial work has been carried through at the experimental stations. On this point a special report was recently submitted.

30. After a period of inactivity in that respect, which has lasted almost uninterruptedly since my office was merged in that of the Director in 1885, the correspondence induced by enquiries from persons interested who seek information and advice in agriculture revived.

vigorously during the year. This has in part only been due to the work of the District Agricultural Associations that have sprung into being, but it should be noted that, through these Associations, a certain amount of seeds has been distributed, but information as to results of these trials has not in many cases come forward, nor is it likely that such distribution will lead to much useful result unless the matter is taken up and dealt with systematically under good advice. So far as I am aware only one of these Associations has shown any really useful vitality during the year, and that is the Tanjore Agricultural and Industrial Association. The Members of that Association, at my suggestion, started a number of "co-operative field experiments" in certain simple details of agricultural practice, and, when I visited the district in August last, I found that a very satisfactory beginning in this direction has been made. For a good many months, the Association received the help of one of our Agricultural Inspectors, but it was necessary to remove him elsewhere later on, and such work cannot at present be expected to go on properly unless the workers receive constant advice and encouragement from experts. What the Tanjore people have done can, however, be undertaken in all districts, if the members of the Associations will devote their attention first to ascertaining in what direction action can best be taken. In fact, the most useful function that these Associations can at present fulfil is to extend the sphere of investigation which is the primary function of an Agricultural department.

31. *Staff.*—I was on duty throughout the year, and excepting a week's casual leave in July, and the usual holidays at Christmas, I was on tour for 248 days, being so occupied for half the month or more in every month but April, July and October. My journeys involved 17,600 miles travel by rail, and nearly 300 by road. The long journeys necessary to get from Bellary to Koilpatti, and thence to Coimbatore and Chingleput (Attur) account for this great mileage, which also included the usual annual visit to Pusa as a Member of the Board of Agriculture. The experimental stations should ordinarily be visited at least once a month during the cultivation season; and I paid 8 visits to Bellary including Hagari in most cases, 2 to Nandyal, one of which was in connection with the award of a premium for crops of "practically pure" Northerns cotton, 3 to Hindupur, 7 to Koilpatti, and 11 to Attur. The latter place was visited usually *en route* to or from other places. Besides this, during the first half of the year, 3 visits to Coimbatore were necessary in connection with the selection of a site for and the starting of the new Institute, whilst the greater part of the last two months of the year were spent there also. The Agricultural Shows at Bellary in May, Conjeeveram also in May, and Tanjore in March, were attended. At the former I delivered an address on "cotton and its improvement," and at the convention held in connection with the latter another on the subject of "tillage, and tillage implements" was given.

Of the other members of the purely agricultural staff, the Sub-Assistant Director was only on duty up to 23rd October 1905, when he most unfortunately had to proceed on sick leave. During April and May he was engaged chiefly in collecting cotton seeds in Kurnool and (Bourbon seed for the Inspector-General of Agriculture) in Coimbatore. He then proceeded to Nellore to assist the local Agricultural Association, and visited the Ponnalur tank. After that he went on to inspect the Local Fund farm at Bezwada, and was occupied in matters connected with the distribution of cotton seed in Nandigáma, as well as in visiting the Telaprole and Pithápur estate farms. After that, he visited the Komaramangalam estate in Salem, and spent the greater part of August and September in working out details for the farms being started at Hagari and Nandyal, and in distributing the cotton seed stored at Bellary. The breakdown of this officer, Rao Bahadur C. K. Subba Rao, has been a very serious loss to the department at a time when it needs every man it can find. His position was taken with effect from 1st December 1905 by M.R.Ry. R. Ramaswami Aiyar, the Senior Agricultural Inspector, who returned on that date to duty from privilege leave and who was then posted to charge of the Hagari farm. This officer had during the first four months of the year been engaged in connection with the tobacco-curing experiments referred to above, the collection of cotton-seed in Tinnevelly and with alkali land experiments in Madura.

The Inspectors at Bellary and Koilpatti remained unchanged until near the end of the year when the former was deputed on cotton-seed enquiries in the Bellary district and his place taken by a probationer who has been under training at Bellary. Inspector G. Rajagopala Naidu was on miscellaneous duty for the first part of the year in Tanjore, at Penukonda, and in Madura, during the absence of Inspector R. Ramaswami Aiyar on leave, but when the starting of the Central Institute farm at Coimbatore was ordered he was, no one else being available, posted thereto, and was in immediate charge of the works. When the farm at Attur was started, Probationer C. Narayana Aiyar was placed in charge and was subsequently promoted to the grade of Inspector. Two Inspectors of this staff were on duty under the Government Botanist throughout the year, and in July a probationer, who had for a short time been on duty at Koilpatti, was also taken away for the same purpose. Probationers were attached to both the Koilpatti and Bellary farms throughout the year, and towards the end of it two were deputed for duty at Coimbatore. In December an Overseer for the Hagari farm was appointed direct, but he has all his experience yet to gain. He received this appointment in virtue of his having passed at the top of his class from the College of Agriculture.

CAMP COIMBATORE,
29th May 1906.

(Signed) C. BENSON,
Deputy Director of Agriculture.

APPENDIX II.

ADMINISTRATIVE REPORT ON THE AGRICULTURAL STATIONS UNDER THE CONTROL OF THE GOVERNMENT BOTANIST.

A.—Samalkota Agricultural Station.

I have the honour to forward the following Administration report of the Samalkota Agricultural Station for the year 1905–1906.

The energies of the limited staff were largely taken up throughout the year in the acquisition and laying out of the land purchased by Government. In previous years the land of the farm was rented from ryots and for this reason no permanent works or improvements could be undertaken.

The block of land acquired is about 36 acres in extent. It is of an extremely irregular character and the soil is of a very tenacious description. The work of reclaiming has been very heavy. The whole has been cleared of the heavy scrub and fenced according to the usual native methods, mere heaps of dead thorns, date-palm fences, cactus and Korakapalli (*Pithecolobium dulce*). A considerable number of large trees occurred at intervals in the farm. These have been sold by auction, dug out and removed.

The whole cultivable land has been divided into a series of blocks, the areas of these have been calculated and an accurate map of the farm has been prepared. In many cases the configuration of the land has been altered, bunds have been removed, earth carted from the high outskirts to raise low pieces and irregular plots levelled so as to make the land more suitable for comparative experiments in the future.

A path has been made all round the farm and a special coolie is constantly employed in keeping it in order, this being rendered necessary by the rank growth of the local vegetation. Six foot-paths have been made between all the blocks and these are raised a foot above the level of the land for complete separation of the blocks and easy inspection. This has been found necessary because of the irrigation and other difficulties in heavy wet land growing both paddy and sugarcane.

The main channel down the farm has been much altered. It was an irregular waterway, sometimes swelling out to a width of twenty yards and at other places winding irregularly through the fields with large trees on its banks. It has been practically re-made and now consists of a straight manageable irrigation channel of uniform width passing through the length of the farm. It has been carefully sloped and, to prevent erosion, turfed throughout. This work has also necessitated a considerable amount of stone revetment in places.

Three permanent dams with revetments and aprons have been made along the course of the main channel, the local temporary palm-trunk ones having been found unsatisfactory and liable to be washed away during heavy floods. Irrigation pipes have been laid, under the road and paths, from the main channel and from block to block and three drainage channels have been constructed.

The drainage of the farm has been very difficult to regulate as the land slopes rapidly in certain directions and much wash has been experienced in unusual rains.

A new sluice with road-bridge has been made over the branch channel (which acts as the drainage channel to the farm and irrigates villages several miles away). This has been built at the expense of the Pithapore estate.

A signboard in Telugu and English has been placed on the roadside opposite the entry to the farm. A ballaout across the canal has been purchased from the Department of Public Works and a main 16-feet road has been made right through the farm. This road is raised some two feet above the general level of the land and acts as an embankment on one side of the irrigation channel. The earth for its construction has been carried from the bed of Elleru drainage river, advantage having been taken of the clearing of that watercourse by the Department of Public Works contractors both for this and other purposes in the laying out of the farm. The road has been turfed at the sides and levelled, and passes out of the farm at the south and again into the Elleru drainage channel.

The bund along the Elleru river has been handed over by the Department of Public Works to the farm. This consists of an elevated ridge some 20—30 yards wide and extending for half a mile along the entire length of the farm. It was formerly under date trees and under-growth and, besides forming a surreptitious feeding ground for goats and cattle, harboured large numbers

of jackals and wild cats. Much of this has now been cleared. An immense breach at one place which in times of flood endangered the farm lands, has been filled up, and a considerable portion has been covered with sandy silt from the river bed.

The acquisition of this bund is of great value to the farm. It affords sites for buildings. The jaggery store-shed has been completed and now contains a seed-loft and a room for microscopic and other better-class work, besides the main jaggery room. A number of large iron seed bins have been constructed. The store-shed has also a verandah and two tool rooms. Two cattle-sheds have been erected, one for the farm cattle and the other for the Nellore bulls. Sites have been selected and cleared for the Agricultural Inspector's quarters and the bungalow for the Inspecting officer. A considerable portion of the bund has been cleared of date-trees and covered with sandy silt from the Elleru excavations. It is proposed to utilise the whole as a cattle-run and efforts will be made to plant it up with grass. A road will be made along the river border and a fence will be necessary to keep out the cattle which use the river as a road. The enclosing of this part will greatly improve the farm and do away with much of the internal fencing now existing. A local cyclonic storm in March blew down the whole of the fence already erected.

There has been considerable reclamation of land from the water channel in its upper part and a plot is being put under lucerne below the bungalow site. Three pairs of cattle have been purchased during the year from local ryots and a pair of fine Nellore-breeding bulls were obtained at the last Ongole cattle show.

These are some of the chief pieces of work done during the year in the laying out of the permanent farm. There is much to be accomplished yet, but the back of the work is broken and in no former year has anything of the kind been attempted. It will be understood that this addition to the work of the farm officers without any increase in establishment has made considerable inroads on the time which should have been devoted to the study of sugarcane.

2. The area available for sugarcane growing is about 25 acres. The original small piece of land rented has been added to year by year until the final acquisition of the present block. During its whole existence, the farm has been divided into two parts, right and left of the main channel, a wet area where sugarcane is in rotation with wet paddy and a dry area where the rotation is with dry crops. The land has now been planned out with respect to the parts available for sugarcane growing during each year. The usual practice is to plant sugarcane, in rotation with wet paddy, once every five or six years. The farm plan will attempt it once in three. In the dry area sugarcane may be attempted in alternate years. This, if successful, will give us about 10 acres under sugarcane each year. A set of plans has been prepared showing the area under sugarcane each year since the founding of the farm.

3. The functions of the farm are as follows:—(1) Raising or obtaining immune varieties of cane and multiplying these for distribution—Although the demands for seed on the farm has vastly exceeded expectations, it has been found impossible to devote more than 2 acres to the nursery for distribution and it is doubtful whether this will be longer manageable. The preliminary study of the different varieties collected, in some ways the chief work of the farm, is done in the varietal plots. (2) Simple experiments have been made in growing canes in different ways and in manuring them with different substances. It is obvious that little room is left for rotation experiments. Besides the general separation of the farm into the wet and the dry areas, three blocks have, however, been placed apart for definite experiments in rotations, these being under two-years, three-years and four-years courses respectively. The area of the farm is entirely inadequate for a proper working out of this problem. (3) A general study of the sugarcane industry in all its aspects, from the botanical differences of the several varieties to the making of jaggery—This has been carried on in a more or less desultory manner as opportunity offered.

4. It is submitted that the preliminary purpose for which the farm was started has now been in a certain measure accomplished. Canes of all sorts have been collected and tested and those of value have been multiplied for distribution over the Presidency. This work of obtaining new canes of value, it has been pointed out, must be continued, for each cane in turn is likely to become subject to disease. But it is time to consider whether the farm should not undertake the larger questions hitherto merely touched upon, the point of view in sugarcane matters having considerably changed during recent years. For the proper development of a nursery for distribution, for experiments in rotation, for studies in the quantity of water required in the delta for sugarcane cultivation, and, lastly, for improvements in the manufacture of jaggeries and low-class sugars a greater area is needed. It is submitted that the present is a fitting occasion for some decision to be arrived at as to whether the work of the farm should be expanded in these directions. The Samalkota farm is in many ways well situated for such work and large areas of land can conveniently be added if necessary.

5. The year under review was generally unfavourable for experimental work. The heavy laying-out operations have already been referred to. The insufficiency of the staff was early pointed out, but no addition was made in this direction. The close and continuous inspection of the plots which had been a feature of the work on the farm from its commencement had accordingly to be given up.

The urgent need for the distribution of canes to various places including other farms has greatly disturbed the experimental plots, so that it was impossible to reap the whole of each plot and compare it with others.

Lastly, and of most importance, there was an outbreak of disease due to the state of the weather. This is indicated in the monthly rainfalls for the past three years herewith reproduced :—

Month.	1903–1904.	1904–1905.	1905–1906.	Remarks 1905–1906.
March	..	..	8·70	Heavy unseasonable rain not required by the young canes.
April	..	..	1·80	
May	3·60	3·98	1·22	
June	5·11	5·95	2·90	
July	12·53	4·05	3·35	
August	8·58	3·65	7·93	
September	6·58	2·55	8·17	
October	6·01	11·64	1·62	Cane forming time. North-east monsoon failed.
November	7·38	..	..	
December	..	..	..	
January	..	..	..	
February	..	..	1·36	Unseasonable rain during milling.
Total ..	49·79	31·82	37·05	Seasonable rain for the cane's growth during 1905–1906, 25·19 inches in place of 45 inches.

Shortly after planting the plots an unprecedented fall occurred by which many of the sets were covered deeply with earth, and much time and labour was needed to supply the vacancies thus caused. The plants however recovered and there was every prospect of an exceptionally abundant harvest. When, however, the time came for the canes to form, viz., in October—November, the north-east monsoon totally failed. Instead of some 10 to 12 inches at this time only 1·68 inches fell, and there was no rain for the rest of the growing season. Finally, while reaping the canes, a couple of inches fell in February, which caused trouble in the milling. The actual rainfall during the time when the canes were in the ground, while below the average, was greater than in the previous year (March 31st—April 1st) but the time and manner of falling was most unfortunate, resulting in a serious outbreak of disease. This vitiated the results from many of the plots, and, in the absence of the regular inspection notes formerly carried out, the net results were in many cases of little value. The only consolation (and a very poor one indeed) was that the disease was worse in the district than in the farm, practically the whole of the up-land canes, forming half of the area planted, being a total failure. Advantage was taken of the recent addition of an Assistant in Cryptogamic Botany to the Government Botanist's office to make a careful study of the disease on the farm. All the diseased canes were carefully examined and a chart was made indicating the direction of spread. Such "disease maps" have become a feature of the farms under the control of the Government Botanist and it is hoped, by the comparison of the maps of successive years, that we shall be placed in a position to form more definite conclusions as to the canes and mode of distribution of the chief pests.

6. The general line of experiments on the farm was similar to that adopted since the commencement of its history. The area under sugarcane during the year was about 10 acres, and the special variety with which experiments were conducted was the Red Mauritius, the cane which has been most widely appreciated during recent years.

The varietal plots were slightly rearranged, some canes being transferred from class II to class I as they seemed to be worthy of more extended cultivation. Certain canes in the same way were added to the collection.

In the Methods plots experiments were conducted in the use of trash, in green dressing, the part of canes to be planted, the number of sets to be planted per acre, stool planting, wide planting, nursery seed-bed, bamboos for supports and June and September planting, while the question of ratoons received special attention because of the spread of disease.

In the manurials, cattle manure, castor cake in large and small doses, a mixture of pungam (*Pongamia glabra*) and nim (*melia azadirachta*) cake obtainable locally, and a "general cane manure" were given to the canes and the results recorded. The compost pits received the usual attention and a great mass of this substance was added to the land in preparation for the new crop.

Various other subjects received attention. The "disease plot" was continued, unsuccessful attempts were made to raise seedling canes on the farm and in the green house at Ootacamund, studies were made regarding early-maturing canes and the destruction of jackals, while canes were planted in June and September for sale at local festivals.

A careful botanical study was made of the canes grown on the farm. The artist painted such as were new and the Botanical Assistant investigated the botanical characters of each. Specimens of the canes were selected and packed off with paintings, drawings, descriptions and measurements to the Director of the Government Plantation in the Mauritius, in order that we might be able to call the canes hailing from that country by their right names.

All the canes of class I varieties were analysed as usual and in many of the plots a series of ripening analyses were made in order to determine the proper time for reaping the canes and the effect of different manures on their ripening. A quantity of jaggery was stored in the jaggery shed and will be placed in the market when the usual rise in price takes place. Meantime, the jaggery has been analysed at the commencement of the experiment and will be again examined before sale to see if this local method can be profitably adopted and what loss is incurred in jaggery during storage.

7. The number of visitors has been well sustained during the year. The Government Botanist inspected the farm seven times. It was also visited by the Director, the local factory officials, the Cryptogamic Botanist to the Government of India, the Agricultural officer to the Court of Wards, the Government of Bengal Jute Expert, the Superintendent, Civil Veterinary Department, the Brazilian Commissioners, numerous District Munsifs, Deputy Collectors, Tahsildars and High Court Vakils, about 40 students of the Training College, Rajahmundry, the Municipal Commissioner, Berhampur, the Secretary, Chamber of Commerce, Cocanada, and various other gentlemen. Besides these, hundreds of local cultivators went round the farm at frequent intervals and a few travelled from other districts.

Arrangements were made for two Agricultural officers to be trained at the farm, but of these only one remained for more than a few days. He was recommended by the Central Agricultural Committee and spent two months on the farm.

As in preceding years, canes of good varieties were distributed to careful cultivators in the several taluks of the district. These small selected plantations were twice inspected during the year by the officer in charge. His reports tell of successful cultivation and the general replacement of the local varieties by the farm canes. The new canes have now obtained a firm foothold in the district and almost all the canes distributed are being retained or sold for planting. In the drought-striken Peddapur taluk the whole of the local canes were wiped out, while the farm canes, although greatly distressed, withstood an absence of irrigation for over two months and were then saved by irrigation from wells.

The distribution of canes was as large as usual, many applicants having perforce to be refused because of insufficient material. Heavy consignments were forwarded by truck to Palur and Melrosapuram, a truck load to the Nellikuppam factory for distribution to the local ryots, about 10,000 selected canes to local ryots, cultivators of other districts (as Kistna and Guntúr), the Court of Wards Estates, district Agricultural Associations, Hyderabad, Bengal, Eastern Bengal and Assam, Bangalore and other parts.

A note on "Sugarcane cultivation, with special reference to irrigated Delta lands" was printed and distributed as a leaflet of the department, and an article was written for the first number of the Agricultural Journal of India on the general aims of the farm.

8. Other crops grown on the farm were wet paddy, several local varieties of which and the 60 days Tanjore kind being grown. An acre was put down with the best local plantain. In the dry area dry paddy and redgram were successfully grown in rotation with sugarcane, while other such rotations were chillies and turmeric. The latter crop was especially successful, but the drought diseases attacked the chillies and redgram, so that the outturn from these was not so good as usual.

Some varieties of Bengal jute were sown on the farm. But owing to insufficient knowledge of the crop and its correct time of sowing the results were not satisfactory. The experiments are being tried again under the advice of the Bengal Jute Expert, who visited the farm and inspected the fibre produced.

B.—Palur Agricultural Station.

I have the honour to forward the following Administrative Report of the Palur Agricultural station for the year 1905-1906.

2. The farm consisted, during the year under review, of 16 acres of wet and dry land. The wet land is irrigated by a channel from the Tiruvádi anicut while the dry land is fairly supplied by a couple of wells. Samples of soil were forwarded to the Agricultural Chemist to the Government of India for analysis and he reported on it as follows:—"well supplied with mineral plant food, and should prove very fertile if manured with ordinary farm manures." Perhaps the greatest agricultural defect of the district is the scarcity of such manures.

3. The land was enclosed by local fences and laid out with paths and in plots. In the wet land the bunds provided suitable divisions but the dry land was split up into half-acre plots, these being considered convenient from the experimental point of view. As the land was only rented as an experiment for two years, no permanent buildings were erected, but a mud-walled office, seed-house and cattleshed were put up. A pair of cattle was purchased locally.

4. Rather suddenly, towards the end of official year, it was decided to make the station permanent. With some difficulty a block of land was selected surrounding the present site as a nucleus, marked out and purchased at a cost of Rs. 27,824, comprising an area of 51·69 acres.

Of this about 38 acres are dry and fairly provided with wells and 13 are wet land of the same description as that mentioned above. The new land with its standing crops was not however handed over to the farm officers before the close of the year.

5. The farm was placed under the management of an Agricultural Inspector. On January 1st an assistant was added, but the heavy work of reaping the ground-nut and sugarcane in the early part of 1906 and the necessary studies for the acquisition of the new land did not permit of any touring being effected. The Agricultural Inspector was removed from the charge of the farm at the end of the year and sent to Samalkota for training in sugarcane cultivation in which he seemed to be deficient. His place was not supplied before the end of the year.

6. The weather was, in the main, unsatisfactory, as was the case generally over the Presidency. The crops being capable of irrigation at need did not however suffer so much on this account. The first three months of 1905 were, as usual, dry. A couple of inches fell in April 1905, 1½ inches in June and about 1 inch in July. As this is the first year of the farm's existence it is not possible to compare this rainfall with that of previous years, but it may safely be regarded as deficient—under five inches in six months. The ground-nut and indigo of the district during this period suffered, the former from the surul puchi (*Anacampsis nextoria*, Meyr.) and the latter from general drought. In October-November nearly 36 inches of rain fell and this abnormal fall affected the crops in the neighbourhood. No rain again fell from the 27th of November till the 15th of January. Indigo and other sowings were delayed and the ragi of the district was seriously injured.

While the total rainfall for the year April-March was over 54 inches, it fell unseasonably and rendered cultivation difficult.

7. The main functions of the farm are two-fold, the study and improvement of the groundnut and the introduction of better class canes. Perhaps to this may later be added the manufacture of jaggery. These functions have been held steadily in view during the year.

All the available varieties of ground-nut in India have been got together. These were obtained chiefly from the Bombay and Saidapet farms while several additions were also received from Ceylon. Most of the Saidapet seed was bad. As there was considerable doubt as to the correct naming of these varieties, Japan, the United States of America, and the West Coast of Africa were asked to send their best varieties, while a hundredweight of Mauritius seed was imported direct in order to test its value side by side with that obtained ten years ago. The ryots complain that it has rapidly deteriorated. These varieties were as far as possible compared in their growth and yield with the local kinds. There were two crops during the year, one rainfed and the other irrigated, but both on dry land. A small area of wet land was also planted. The various kinds grown were subjected to a careful botanical analysis and fifteen samples of pods were forwarded to the Agricultural Chemist to the Government of India for determining their oil-content.

8. The sugarcane varieties introduced on the station, were such as had succeeded at Samalkota or were thought likely to be of use in the lighter South Arcot soils. A small plot of dry irrigated land was planted and the canes analysed in due course. The larger wet area canes were planted later and had not matured sufficiently at the end of the year for examination at the mill. The analysis was kindly carried out by the chemist to Messrs. Parry & Co. at the Nellikuppam factory. Owing to water difficulties the nursery system of planting was introduced and this has arrested the attention of the cultivators and is being followed in several directions.

9. Indigo, which was formerly a successful rival of ground-nut in South Arcot and is still largely grown, was introduced on the station as a rotation crop. Among other kinds grown were the Java-Natal (*Indigofera arrecta*) and the newly re-discovered *Indigofera longeracemosa* of Travancore. As already stated the indigo crop suffered severely on account of unfavourable weather.

A set of cakes of locally prepared indigo was forwarded to the Indigo Expert to the Government of Bengal. He analysed these and compared them with the Bengal product.

10. The remaining rotation crops were gingelly (*Sesamum indicum*, D.C.), ragi (*Eleusine coracana*, Gœrtn.) and paddy, while a few cotton plants were also grown. Guinea grass (*Panicum maximum*, Jacq.) was successfully introduced on the farm and should be of value in this fodderless region.

The great deficiency in farm manures led to some attention being paid to the preparation of weed-pits similar to those at Samalkota. The absence of vegetable matter rendered this work one of great difficulty. Owing to the labour difficulties in the district a set of cattle drills and harrows was introduced from the Ceded Districts and these were used in several of the farm operations.

A careful map has been prepared and recorded of all the crops on the plots for each half-year as well as such previous history of the land as could be obtained.

11. The diseases of the ground-nut were carefully examined during the year as opportunity offered. An unsuccessful attempt was made by the Entomological assistant to work out the life-history of the surul puchi. Preliminary trials were made in spraying the crop for millepedes and tikka. Light traps were constructed for the study of the night fauna of the crops and jaggery traps were prepared for jackals in the cane.

Disease maps have been inaugurated as at the Samalkota farm.

12. It is full early for the station to attempt to influence the surrounding cultivation. The ground-nut varieties have as yet not been fully acclimatised nor are there sufficient quantities for distribution. All applications were therefore answered with good selected seed of the local kind. About 1,000 pounds of seed were distributed during the year to about half a dozen Madras localities, Assam, Central Provinces and United States of America. There appears to be some prospect of the farm's usefulness in this direction being appreciated. The sugarcanes are not yet ready for distribution. It will take a year or two before much selection can take place. Meanwhile, the Red Mauritius is asked for on all hands, and our supply has not been at all equal to the demand. About 1,300 canes have been distributed, largely through the aid of Messrs. Parry & Co. who want to see this variety widely grown over the district.

13. The visitors to the farm have been noted in the farm books. The Government Botanist inspected the farm seven times. The Director visited the farm in December. The officers of the Nellikuppam factory and various local officials and ryots have been in the habit of coming to see the farm's progress.

C.—Taliparamba Agricultural Station.

I have the honour to forward the following Administrative Report of the Taliparamba Agricultural station for the year 1905–1906.

2. The lands were acquired in the latter part of 1905, but, by the permission of the owners, the farm operations were undertaken at an earlier date and were in full swing at the commencement of the year. At first under a fieldman despatched from my office, the permanent incumbent, an Agricultural Probationer, arrived on 16th July 1905. The farm was, during the rest of the year, under his sole charge.

The total area of the station is about 84 acres. This is of a most varied character, consisting of pepper gardens, hill-paddy, wet land, scrub, pasture and forest. In some parts panthers are of frequent occurrence and rocks and caves abound. The whole area has been brought under control and the pepper gardens located. These cover altogether about 16 acres.

3. Paths and roads have been made in all directions, culverts and bridges built to regulate the torrents in the rainy season and much of the scrub of Lantana cleared. The two existing huts have been thoroughly repaired and five new ones built at various spots for the permanent labourers, so that the whole area has become inhabited. An inspection shed has been converted into a convenient office. Sites have been selected for the Agricultural Inspector's quarters and an inspection bungalow, and these sites have been approved. No work has however been undertaken on them by the Department of Public Works.

4. The wells throughout the cultivated part have been examined and cleared of silt and a set of borings has been made to determine the water-level in the different classes of land. Water supply is a matter of difficulty during the dry, hot half of the year. A fire-line has been drawn round the pasture land and the grass cut as far as possible. Trespasses are frequent and it has been found necessary to consider the advisability of erecting a cattle-pound.

5. The pepper area, much of which has been allowed to run wild for years past, has been completely cleared, dug and largely terraced. It has been divided roughly into three blocks according to the lie of the land, its previous history and former ownership. The whole has been divided up into 80 inspection plots of convenient size with paths between.

A series of farm maps have been drawn but the detailed survey of the plots remains to be done.

6. The weather has been rather abnormal, judging by local report. A rain-gauge has been put up and the individual falls recorded. Five years' rainfalls have been copied from the Taliparamba village register, but, although these will act as a general guide, they cannot be too closely relied on because of the difference between the two localities. It appears that the earlier part of the year is very hot and dry while the fall during the South-West monsoon is very heavy. Some 100 inches fell in the three months June—August and another 15 in October. This rainfall appears to have been excessive, and as all the cultural operations on a pepper farm are in full swing during the monsoon, the rainfall during June—August is of special interest. The opening months of 1906 were unusually dry and hot.

7. The main functions of the farm are the improvement of the pepper industry in all its aspects, including the raising of new and improved varieties and their wide distribution over the district. With a perennial which bears first in its fourth year this will be slow work. Of minor importance are other crops detailed below. It is over 100 years since the founding of the Anjarakandi "spice garden" by the East India Company and it is time that the rich Malabar littoral should again have a garden devoted to cultures likely to succeed in its climate. While, then, we are waiting for the tardy results of the pepper vines, such other plants will be introduced as appear likely to be of use in the district.

8. The following are the lines of study at present being carried out. As time proceeds it is certain that individual alterations will be introduced. The Malabar coast has never had attention given to it by the Agricultural Department, and all the cultivations are new.

The study of pepper in all its branches has been undertaken. At first a close study has been made of all the local practices and these are being compared with those of other parts, especially the Wynaad. As will be seen below, it is intended to scour the whole district in order to learn the exact method of procedure and where it may be improved.

9. Although touring has not been neglected, the actual pepper on the station has received most attention. The 80 plots have been rather exhaustively studied and the harvest from each plot kept separate. The total value of the crops on the station was about Rs. 1,000 and would have been considerably greater but for the low price of pepper. Among other lines of observation in the plots, the effect of shade and aspect, soil and moisture are being studied and recorded. Experiments in mulching, manuring, moulding and pruning are being carried out. Leaf pits have been dug as in the North Canara gardens.

10. The standards to which the pepper vines cling have received an exhaustive study, their botanical and vernacular names having been in most cases determined and their relative popularity among the native pepper growers. Several new trees have been introduced for this purpose. The flora of the whole station has been examined and a provisional list prepared for the determination of the best pepper localities from their natural covering of plants.

11. The pepper varieties grown on the farm have been carefully examined, and their sexual differences noted, this being important from the crop point of view. Several new kinds have already been collected and introduced into the farm, notably the three best Wynaad kinds and cultivated pepper from Bombay and Burma. Several tours by the Government Botanist have been largely devoted to the study of wild peppers and a number of these have been introduced into a botanical garden in the station. The diseases of the vines have been carefully noted and certain areas have been marked and numbered as "disease spots". These will receive quite special attention. Finally, in order to carry out without confusion this extensive programme, a system of labelling the vines has been introduced and a set of registers has been started on the farm.

12. As a subsidiary study the cultivation of the district is being investigated. The following have received special attention:—the growth of hill-paddy with muruku (*Erythrina indica*, Lam.) standards, the wet paddy and the local grams and pulses. A collection has been made of the pasture grasses on the upper part of the station and a large number of guinea grass (*Panicum maximum*, Jacq.) roots have been introduced for fodder purposes. A first attempt was made in planting cottons of long staple, but the seed was sown too late and the growth was unsatisfactory. A set of lemon-grass (*Andropogon Nardus*, Linn.) plants is established, the roots being received from Cochin and Ceylon. A small number of rooted cuttings of rubber (*Ficus elastica*) have been received from Burma.

13. Although there was only one agricultural probationer on the farm, touring was considered to be so important that his place was temporarily supplied from head office while he toured through some 30 villages in the adjoining taluks of Chirakkal and Kottayam. Naturally this was for *his* information as we are not yet in a position to try and disseminate knowledge excepting in a very small way. The Government Botanist visited the farm three times during the year but also undertook as many tours in other parts in connection with pepper. The study of the Wynaad varieties resulted in interesting discoveries with regard to variety and sex and these were published in the form of a bulletin of the Agricultural Department. A short note on the same subject was published in the *Agricultural Journal of India*. The Director paid a short visit to the farm in December and not a few of the local proprietors and cultivators have from time to time been conducted round by the officer in charge.

MADRAS,
25*th May* 1906.

(Signed) C. A. BARBER,
Government Botanist.

APPENDIX III.

ADMINISTRATIVE REPORT OF THE SUPERINTENDENT OF PUMPING EXPERIMENTS.

I have the honour to submit the administrative report of the department devoted to experiments in irrigation by pumping.

2. During the time I was on furlough and in fact till practically the end of the official year 1904–1905, the work was under the supervision of Mr. S. Rajagopalasawmy Mudaliar, a Supervisor of the Public Works Department, whose services have been specially lent for this work. At the time I took over charge from him, engines and pumps were at work at the following places:—

(1) Melrosapuram—3½ H.P. engine and 3″ pump.
(2) Agricultural College, Saidapet—6½ H.P. engine and 4″ pump.
(3) Cuddalore—3½ H.P. engine and 3″ pump.
(4) Mánámadura—3½ H.P. engine and 3″ pump.
(5) Kadiampatti—6½ H.P. engine and 4″ pump.
(6) Coimbatore Jail—6 H.P. engine and a pair of plunger pumps.

All these installations except No. 6 had been paid for out of funds originally placed at my disposal by Government. But in addition a number of other installations were in course of erection, most of them belonging to private individuals—

(1) M.R.Ry. Tota Ramanujam Chetty, Kattalai—25 H.P. engine and 12″ pump.
(2) „ K. Vasudeva Aiyangar, Trichinopoly—3½ H.P. engine and 3″ pump.
(3) Bezwada Technical school, District Board Kistna—3½ H.P. engine and 3″ pump.
(4) Attur, Government—8 H.P. engine and 5″ pump.
(5) Villupuram, Government—9½ H.P. engine and 6″ pump.

3. On taking over charge, with the exception of the engine at Cuddalore, Mánámadurai and Melrosapuram, all of which were 3½ H.P. engines driving 3″ pumps, none of the installations were working satisfactorily and a great deal of distrust as to their suitability for irrigation work had been engendered. In this report it is not necessary to detail the investigations which were made to ascertain the cause of bad working, and it will suffice to say that in the main it was found to be due to placing on the engine a greater load than they could safely carry for any length of time. Added to this certain minor defects obscured the main issues and rendered the work of getting the engines into good running order much more troublesome than it should otherwise have been.

4. During the year, I think we may safely claim that irrigation by pumping with engines and centrifugal pumps has passed completely beyond the experimental stage and that as soon as the results which have been achieved are fully known, there ought to be a great development in this direction. At the outset it was generally assumed, by those who were supposed to know, that the experiments would end in failure because there were so few wells capable of yielding a sufficient supply of water to afford employment to even the smallest size of engine and pump. As regards the greater part of the country this is probably true, but during last year it has come to our knowledge that there are extensive tracts of land underlaid with water in sufficient volume to give profitable employment to large numbers of engine and pumps. In not a few instances it has been found that with an engine and pump it is practicable to sink wells to considerably greater depths and thus draw upon a much larger volume of underground water and within limits by no means so narrow as we originally anticipated it has been ascertained that the provision of vastly increased pumping power has rendered it practicable to make use of supplies of water hitherto unknown or regarded as inaccessible.

5. As to the cost of raising water by oil engines and pumps the results obtained so far are by no means final and I confidently anticipate that with increased experience the cost of pumping will be considerably diminished. In the detailed account for each station the actual cost of pumping is given where it is known with any approach to accuracy, but here in general terms it may be stated that the cost of lifting water with small oil engines and pumps where work can be found for the engine for at least six hours a day is less than one-half that by which it can be done with cattle and that too under normal conditions. If there were any large demand for cattle for working mhotes, the cost would rise enormously and in fact would be prohibitive for ordinary irrigation work. The ryot can only successfully irrigate from wells so long as his cultivation is confined to an area which can be watered by the cattle he is bound to keep for his general agricultural work. Directly the area under well irrigation exceeds this limit the cost becomes excessive and it is only under extraordinarily favourable circumstances it is worth while for him to go in for such irrigation. With the engine and pump the cost of irrigation can be very accurately determined and the larger the volume of water or the greater the depth from which it is lifted the more efficiently the work can be done and the less the cost per unit. Any rapid expansion of well irrigation using either the picottah worked by men or the mhote by cattle is not possible. With engines and pumps the only limit to extension is the volume of water and the amount of capital available. It is true that very few landholders are in possession of sufficient ready money to enable them to adopt a method of lifting water which involves a considerable capital outlay, but by means of the Agricultural Improvement Loans Act the difficulty has been got over and a considerable amount of money has already been disbursed for the purchase of oil engines and pumps. The following is the list of the loans which have been granted:—

			Rs.
(1)	M.R.Ry.	Tota Ramanujam Chetty, Trichinopoly	8,000
(2)	„	Tilla Govinda Gramani, Nellikuppam... ...	3,000
(3)	„	Govindasawmy Mudaliar, Pagalpatti	2,500
(4)	„	Appasawmy Mudaliyar, Pallavaram	5,000
(5)	„	T. S. Narayanasawmy Aiyar, Tirukarugavur... ...	2,000
(6)	„	T. Nataraja Pillai, Kubur	2,000
(7)	„	Muthusawmi Mudaliar, Satyavizianagram	2,000

A considerable number of other applications are under investigation. The procedure adopted with regard to these loans is that with the borrower's consent the money is paid over to me to enable me to purchase the necessary machinery and to get it erected *in situ*. When the work is completed a statement of accounts is rendered to the borrower and the balance, if any, paid over to him. If, as I anticipate, there is a considerable extension of cultivation under engines and pumps in the future, it is likely that the great majority of the installations will be put up with money borrowed under this Act.

6. The work of the department during the year has been growing steadily and the establishment has been increased by three supervisors and two draftsmen, so that at the present time I have under me four supervisors and one sub-overseer, and for these men, in the investigation of the many proposals which come before us and in the carrying out of such projects as are brought to maturity, ample work has been found. At the beginning of the year there were eight Government engines at work or being erected and during the year the number has increased by the installation of a 28 H.P. engine and 10″ pump and a 3½ H.P. engine and 4″ pump at the Hagari experimental farm and by the installation of a 9 H.P. engine and 3″ pump at the new Government experimental farm at Coimbatore. For private individuals the following work has been done :—

(1) In the Arni Jaghir a 9½ H.P. engine and a 5″ pump have been set up in the Palace garden at Satyavizianagram.
(2) A 2½ H. P. engine and 2″ pump for Mr. N. Subramaniam in the Luz.
(3) A 5 H.P. engine and a 3″ pump for the Zamindar of Kasimkóta at Kasimkóta.
(4) A 6½ H.P. engine and a 4″ pump for Mr. Gopinath Tawker at Surapet.
(5) A 9½ H.P. engine and a 4″ pump for Mr. Panduranga Mudaliar at Cuddalore; also a 6½ H. P. engine and a 4″ pump at Siruvanur.
(6) A 14 H.P. engine and a 5″ pump for Mr. Appasawmy Mudaliar at Chittatur.
(7) A 9 H.P. engine and a 4″ pump for Mr. Tilla Govinda Gramani at Nellikuppam; with this plant a sugarcane mill has also been installed
(8) A 7½ H.P. Engine and a 4″ pump for Mr. Narayanasawmi Iyer at Tirukarugavur.
(9) A 7½ H.P. engine and a 3″ pump for Mr. Govindasawmy Mudaliar at Pagalpatti.

In addition to these engines the erection of which has been in part or wholly supervised by the department a number of other engines have been installed by private individuals without our assistance. Amongst them may be mentioned—

(1) A 2½ H.P. engine and a 3″ pump for Mr. Ratnasabapathy Mudaliar at Tondiarpet.
(2) An 8 H.P. engine and a 4″ pump for Mr. Abraham Pandither at Tanjore.
(3) Four 9 H.P. engines and pumps for sugarcane cultivation in the neighbourhood of Nellikuppam by Messrs. Parry & Co.
(4) One 12 H.P. and one 18 H.P. engine for Mahamadia & Co., Dhárápuram.
(5) A 3½ H.P. engine and a 3″ pump for the Thambiran Swami at Auduthorai.
(6) Two engines of 4½ and 6 H.P. respectively, for a Subba Naidu of Nellore.

whilst the Madura District Agricultural Association have recently purchased a 9 H.P. engine and a sugar mill to which they intend to add shortly a centrifugal pump for watering the lands of the old experimental farm near the Tamkum bungalow in Madura.

7. In addition to the oil engines already mentioned which have been purchased for pumping water for irrigation a considerable number of oil engines are employed in pumping water or sewage in connection with the sanitary engineering works of several towns. Amongst them may be mentioned—

(1) Five 40 H.P. and two 32 H.P. engines purchased by the Corporation of Madras.
(2) An 8 H.P. engine at Vellore.
(3) A 1½ H.P. engine at Guindy.
(4) A 1½ H.P. engine at Vizianagram.
(5) A 9 H.P. engine for Bangalore.
(6) A 7½ H.P. engine for Salem.

Further three engines aggregating 42½ H.P. have been supplied for pumping water from Kole lands on the West Coast.

8. Summarising the above figures 35 engines aggregating 182 H.P. are or will be shortly employed for irrigation work, 12 engines aggregating 291½ H.P. for the water-supply and sewage of towns and three engines totalling 42½ H.P. for the drainage works.

9. The convenience of the oil engine as a source of motive power is now very generally recognised and even in the South of India where industrial development is in such a backward state the number of oil engines in use amounts to nearly 200. There are a large number of oil engine makers in Great Britain and between the productions of the best makers there is probably but little to choose. When these experiments on pumping with oil engines began, the circumstances were somewhat different. At that time the Hornsby-Akroyd patents had not expired and unquestionably the Hornsby-Akroyd engine was then the engine best adapted to the conditions out here. Excellent engines were then made by such firms as Crossley Brothers, Ruston Proctor & Co. and Tangye & Co., but they were only suitable for working with kerosine oil; whilst the Hornsby-Akroyd engine would work almost equally well with liquid fuel, the cost of which in Madras varies from one-third to one-fourth that of kerosine oil. In a factory the cost of running the oil engine is but a fraction of the daily working expenses, but in a pumping installation the cost of running the oil engine is everything, and economy in fuel consumption is therefore a matter of great importance. The Hornsby-Akroyd patents have now expired and there are a large number of oil engines on the market which will run

either with liquid fuel or kerosine oil. But, so far as I am able to judge, it appears to me that Messrs. Hornsby & Sons of Grantham are still turning out the most suitable engine for our work. I have carefully considered the question as to whether we should try other types of engine and I have decided that it is inadvisable to do so mainly for the following reason. The successful working of oil engines for pumping depends entirely upon the fact that they can be safely left in the hands of comparatively unskilled men, but it is necessary that repairs, renewals and breakdowns should be attended to promptly and at the least possible cost. If, of the oil engines of one type, there are a large number at work it would pay one firm in Madras to make a speciality of the business and to keep in stock special parts required for renewals, whilst if the business were split up between two or three agency firms it would probably not be worth the while of any one of them to go in for it. Without going into details at inordinate length, it is perhaps difficult to adequately convey an impression of the importance of keeping to one type of engine, but the fact has been very forcibly impressed upon us during last year by the changes which Messrs. Hornsby & Sons have introduced into their own engines. Every change in pattern means an increase in the stock of spare parts which have to be kept available for immediate use and already there is difficulty and delay in carrying out renewals of parts of engines which have been installed three or four years ago owing to spare parts not being kept in stock either by the owners of the engines or the agents who imported them.

10. Ever since these experiments were started I have devoted a good deal of attention to studying other methods of developing power than by means of oil engines of the type we are now generally using and it will be convenient here to record the conclusions arrived at as they determine how the various schemes which come before me are dealt with. Excluding electrical methods of driving pumps which may become of great importance in the future but which at present are entirely outside the range of practical engineering in this Presidency, motive power can be obtained from steam engines, Diesel engines, and gas engines worked by producer plants. The cost of fuel whether coal or wood practically excludes steam engines altogether. For the experiments in pumping which were started at Attur a Diesel engine of 8 H.P. was got out from home, but before employing it on pumping work it was set up in the School of Arts workshops and has remained there ever since. It now forms part of the equipment of the engine driving class and when the engine is in good order it works with great fuel economy and very steadily, but unfortunately it is always getting out of order and is much too troublesome a motor for practical work. The defects are partly due to faults in the design but mainly to the small size of the engine and the makers now admit that it is not a practical motor. The smallest size of engine which is now on the market is, I think, one of 15 B.H.P. and this is said to be not altogether satisfactory in the hands of a native driver. It is an expensive motor and requires a skilled mechanic to look after it. Though it is much more economical than a Hornsby engine of the same size, the saving in fuel is more than balanced by the extra cost of superintendence and the larger amount which has to be allowed for interest and depreciation. It is not exactly easy to say at what power the Diesel engine becomes more economical than the Hornsby as so many factors have to be taken into account and each case must be dealt with on its own merits. But for irrigation work I am of opinion that the employment of the Diesel engine is not likely to prove of marked advantage for engines of under 40 or 50 H.P.

11. With the gas engine worked by producer gas I have as yet no experience in connection with pumping, but I should have no hesitation in advising the adoption of this method of producing power where the conditions are favourable. The lowest limit of size is probably about 15 B.H.P. and the main question is the cost of fuel which can be used in the gas producer. Anthracite coal is the best fuel to employ, but with coke or charcoal satisfactory results can also be obtained. All the Indian coals are unsuitable for use in suction gas producers. In Madras there are two suction gas producer plants working in the Mount Road. One of them uses anthracite imported from Wales and the other Bengal coke. Both work satisfactorily. The latter plant was tried with locally purchased charcoal with satisfactory results, but some additional scrubbers between the producer and the engine appeared to be necessary to get rid of the increased amount of tar produced. It would be desirable to set up a suction gas producer plant for irrigation work and to carry out experiments on it, but as the necessity for these experiments involves some uncertainty as to the results it would probably be better that they should be done at Government expense than at the risk taken by any private individual.

12. Whilst I was on furlough Mr. Rajagopalasawmy Mudaliar purchased a set of boring instruments capable of boring to a depth of 50 feet and during the year under review these have been in almost continuous use and the results obtained with them have been of considerable value. As a preliminary to well sinking the information yielded is often of great value and in not a few instances the boreholes themselves are a ready means of tapping supplies of underground water under pressure. In the tract of country between Pondicherry and Cuddalore artesian and subartesian wells are very numerous and there are a considerable number of skilled well-borers who have much experience of this kind of work. In the Coimbatore district where the wells are merely deep excavations in the partially disintegrated rock valuable additional sources of supply have been opened out by sinking boreholes, which penetrating to a much greater depth than it is practicable to sink the wells, frequently intercept water under pressure in fissures, and such water not unfrequently rises up the borehole with considerable velocity. We have no definite knowledge

as to the exact conditions, which must prevail, for the sinking of boreholes to be a profitable undertaking and it is probable that only by experience shall we be able to find out the boundaries of such areas.

13. The collection of information regarding the duty of water on the lands under the pumping stations has not yielded much information of practical value. In the first place the last two seasons had been of an abnormal character and the water-supply has in some instances been much less than was anticipated and in other cases though the water-supply was ample the deficiency of rainfall necessitated the application of an unusually large quantity of water to the soil. Information collected under such circumstances would nevertheless possess a considerable value if it could be relied upon. But so far it has proved in practice difficult to get records properly kept. The idea at the outset was that the centrifugal pump might be used as a meter to measure the water running on to the land, but experience shows that in the hands of native drivers the speed of the oil engine is generally below normal with the result that the centrifugal pump delivers only from three-fourths to seven-eighths of its full discharge. This introduces an element of uncertainty which would be of greater importance if the cultivation under the pumps was carried on under normal conditions. Most of the pumping installations are watering what was formerly dry land and the process of converting it into wet land or into land bearing garden crops takes a year or two and sometimes longer. In several instances the experimental crops have proved a failure either because no attempt should ever have been made to grow them or because the cultivation was not carried out under proper conditions. In any case the duty of water is not to be obtained from the records of a single season and I anticipate that valuable information will be obtained at some of the larger pumping stations only if provision is made for getting accurate records. This is likely to prove a great difficulty as except at the Agricultural College I have been unable to get the system of agricultural accounts kept which was devised and approved of by the Board of Revenue in resolution No. 153, dated 25th April 1904.

14. Our anticipations regarding the possibility of entrusting oil engines to the care of native drivers on a comparatively low rate of pay have been fairly well realised and during the year an oil engine driving class has been opened in the School of Arts for the purpose of training boys and young men to look after oil engines. A considerable number of pupils attended during the year and all those who have qualified themselves have easily found employment. The engine driving class is however not yet in a satisfactory condition. This has been mainly due to the difficulty of getting a competent instructor. It is necessary that such a man should be a good fitter with a practical knowledge of oil engines and their working, that he should be able to maintain discipline among a lot of boys, that he should speak Tamil fluently, and above all things that he should be able to teach the class what he wants them to learn and to explain in simple language the details of the processes which constitute the cycle of operations in an oil engine.

15. In the appendix, Table I furnishes a summary of the expenditure on the pumping experiments from the beginning from which it will be seen that the total expenditure in 1903–1904 was Rs. 13,646-9-6, in 1904–1905 Rs. 14,397-11-0, and in 1905–1906 Rs. 21,908-1-11. To these figures may be added a sum of Rs. 5,304 for the pumping station in the Coimbatore Jail, Rs. 4,064 expenditure at Melrosapuram, Rs. 3,717 at Villupuram and Rs. 1,996 expenditure at Attúr in the Public Works Department, making a total expenditure of Rs. 65,033-6-5. In Table II expenditure for 1905–1906 is classified under the heads of establishment, supplies and services and contingencies, and in Table III details of expenditure under the latter two heads are given for each installation and included in this are some small items of expenditure incurred in boring operations on various Government farms. The accounts for 1905–1906 do not include any of the expenditure for the pumping stations on the experimental farms at Hagari and Coimbatore. The expenditure at Attúr includes the cost of an 8 Horse Power Diesel engine which was got out as an experiment but was never sent there and it is now used for demonstration purposes in the engine driving class at the School of Arts. There is also to the credit of the Attur installation a sum of Rs. 450, due to the sale of the 5″ pump to Mr Appasawmy Mudaliar. The accounts of the installation at Villupuram include the cost of the Priestman engine which ought never to have been sent there. The Kadiampatti installation is debited with the cost of two centrifugal pumps. The first one proving unserviceable was returned to Madras and after certain alterations was set up at Attur in place of the 5″ pump and it is now working perfectly satisfactorily.

16. During the year under review I have endeavoured as far as possible to supply all those interested in the agricultural development of the country with as much information as possible regarding the development of lift irrigation by means of engines and pumps, and to this end I have delivered lectures at Madura, Tinnevelly, Tanjore, Bellary, Coimbatore and Madras and I have contributed nine articles on the subject to the columns of the *Madras Mail*. As there is practically no literature on the subject of irrigation by pumping, there has been a considerable demand for these papers and I have lately arranged with Messrs. G. A. Natesan & Co. to issue them in book form under the title of "Lift Irrigation". The publication will be similar to the one issued about three years ago entitled "Agricultural and Industrial Problems in India" and is being done at Messrs. Natesan & Co.'s risk.

APPENDIX.

In the following notes details are given of some of the pumping stations which have been at work or under course of construction during the past year.

Melrosapuram.—This is the first pumping station which was started in the Presidency, the engine having begun work in 1902 and the results which have been obtained there up to the end of April 1905 are fully set forth in Bulletin No. 54 of the Agricultural Department entitled "Note on Irrigation by pumping from a well at Melrosapuram." To the information there given, the following details of the working of 1905–1906 are added. The failure of the north-east monsoon in 1904 produced a very marked effect upon the supply of water yielded by the well during nearly the whole of 1905. In the early months of the year the rainfall was insignificant. During the south-west monsoon there was an average rainfall and early in October several days of very heavy rain occurred. The water-supply yielded by the well gradually decreased till the middle of August, after which date its capacity was not fully tested due to the fact that the rainfall enabled pumping to be dispensed with for part of the time, but it was not till the heavy rains of October when over 20 inches fell that the subterranean reservoir was properly replenished.

From an agricultural point of view the year therefore was a very unsatisfactory one. The working expenses including charges for interest and depreciation amounted to Rs. 1,873, whilst the value of the produce was only Rs. 1,331. As I have pointed out before this farm has never been worked in an economical manner and probably less so than ever last year. The engine was run for 944 hours and started 449 times and the average lift was 27½ feet. On so high a lift the engine was undoubtedly overworked and it would probably have broken down had the runs on this lift been of long duration. The Worthington Volute pump which was put in just before the beginning of the year has proved extremely satisfactory and has developed an efficiency over all of fully 50 per cent. This is an extremely good result and it is a great pity that the Worthington Company have discontinued its manufacture as they could only produce it at a high price and were unable to meet the competition of less efficient but cheaper pumps.

Besides the oil engine and pump, there is at Melrosapuram a Chicago aermotor with a 10 feet wheel and observations of the work done by this aermotor have been maintained during the months that it was at work. Last year Government sanctioned the purchase of a 16 feet wind engine of the type which had been awarded the gold medal at the trials of wind engines made by the Royal Agricultural Society of England in 1903. This windmill arrived during the year and was erected at Melrosapuram just before the close of the period under review. The mill is very substantially constructed and is provided with an arrangement whereby the stroke of the pump can be altered to suit the force of the wind. The wind-mill has been at work for some months now, but as yet I have not had time to carry out any systematic experiments with it. The records maintained will show the actual amount of water lifted every day and a comparison can be instituted between this windmill and the Chicago aermotor which is at work only a few hundred yards off. Such results as are available will be included in the second report to be submitted later on.

The Saidapet Installation.—This installation consists of a 6½ H.P. engine and a 4″ centrifugal pump. The water is lifted from a well connected with the Adyar river by means of a culvert. This is the only installation where accurate figures regarding the working of the pump and the agriculture under it have been maintained. It was assumed when the installation was designed that the maximum lift would not exceed 25 feet. But the failure of the north-east monsoon in 1904 caused the Adyar river to fall to a much lower level than it had ever been known before, and the maximum lift in August was over 30 feet. Whilst working on these high lifts the engine gave a good deal of trouble and proved extremely unsatisfactory. Finally an accident happened which it was considered would take more than a week to repair and as the crops on the ground were of unusual value owing to the dryness of the season, it was decided to at once put in a new engine which happened to be available and to repair the damaged one at leisure. Shortly after this a very heavy thunderstorm occurred which raised the water-level in the river 12 feet and since then no further trouble has been experienced except such as was due to the carelessness of the driver. Since the beginning of the year this source of trouble has been entirely got over as the driver has been given to understand that every time the engine gets out of order he will be fined Rs. 5. The total cost of working the engine including a bill of Rs. 471 for repairs and including an allowance of 12½ per cent. for interest and depreciation on the capital outlay amounted to Rs. 1,345. The engine worked on 202 days for 1,820·4 hours and lifted over 23 million gallons of water on an average height of 24 feet. The value of the crops raised amounted to Rs. 2,373 and the expenditure to Rs. 1,693. The value of the crops would probably have been much greater but for the fact that the cholam crops became diseased and had to be removed just at the time when the price for fodder was abnormally high. The cost of lifting the water during the year was equivalent to 4,126 cubic feet lifted one foot high for one anna.

Attur.—This experimental installation from which so much was expected has hitherto proved a failure owing to the small supply of water yielded by the well. The original proposals were formulated in the Public Works Department and sanctioned in G.O., No. 427 I., dated 16th April 1903, and a site for the well was finally selected by the Chief Engineer for Irrigation, the Rev. A. Andrew and myself. Subsequent experience leads me to think that no worse site could possibly have been selected. I mention this to show how little we really knew about the water-supply to wells and about the location of well sites when these experiments were initiated. At that time it was not deemed necessary to make a preliminary exploration of the ground by putting down borings as it was tacitly assumed that on the banks of a river like the Pálár an ample water-supply would be got at without any difficulty. As a matter of fact the well which was 15 feet in diameter and which was sunk by Mr S. Rajagopalasawmy Mudaliar during my absence on furlough after penetrating the surface deposits of sand entered into a bed of alluvial clay which was found subsequently by boring to extend to a depth of more than 80 feet. To assist in sinking the well an 8 H.P. engine and a 5″ pump were erected and when the well-sinking operations were continued to a depth of 33 feet it was found desirable to put in a smaller pump. The 5″ pump was accordingly removed and a 4″ pump substituted. The water-supply from the well amounts to an average of about 20,000 gallons per day and is only sufficient to keep a few acres of land in the immediate neighbourhood under cultivation. At the outset a considerable area of land had been acquired for experimental purposes and when it was demonstrated beyond doubt that the well was a failure, I had a series of borings made in the river-bed and all over the land which had been acquired with a view to selecting a site for the new well. When it was finally decided to convert the Attur station into an experimental farm, a site was selected for a new well and as a preliminary a $2\frac{1}{2}$ feet pot-well was put down as far as it could be got without incurring expenditure on pumping. Tests were then made with a manual pump and it was found that from this pot-well 1,500 gallons per hour could be obtained with a very small depression of the water-level. A well 15 feet in diameter is now being sunk on the spot and it is anticipated that it will yield sufficient water to keep the engine and pump fully at work and to supply the experimental farm with as much water as is needed. I have thought it desirable to dwell at some length on the failure of this well at Attur, because it is from our failures possibly even more than from our successes that we acquire information which enables progress to be made. The Rs. 2,000 or 3,000 which have been spent at Attur will yield a very good return if they prevent a repetition of similar mistakes in the future.

Villupuram.—This installation was started in the Public Works Department and designed by Mr. S. A. Subramania Aiyar, the Executive Engineer, South Arcot Division, and was sanctioned in G.O., No. 48 I., dated 9th January 1904, and transferred to the Board of Revenue in G.O., No. 633, Revenue, dated 15th June 1904. At the time I took over charge I found that the work had been almost completed and that a 6″ pump and a second-hand Priestman oil-engine had been installed. This engine had been in use for sometime in the Public Works Workshops where it had proved very troublesome to work. It had then been returned to the Stores and finally issued for use on an experimental pumping station. On my first visit to Panampattu I found the engine completely erected and supposed to be ready for work. With a great deal of trouble we managed to set it in motion and it was obvious that the valves were in such a defective state that they would have to be reground before any useful work could be got out of the engine. This was done, but other defects were also discovered and as my previous experience with this type of engine made me absolutely certain that it would prove a failure for pumping experiments, I recommended that a Hornsby engine of the same size should be substituted for it and the Priestman engine discarded. This was done and the installation completed. After a few days running it was found that we could obtain an average supply of 30,000 gallons of water per hour from the well without difficulty. The well and pumping installation were situated on a small patch of land which had been specially acquired for the purpose and when negotiations were entered into with the neighbouring ryots, it was found that they were unwilling to pay anything for the water and hoped that they would get it from Government free of charge. As the working of this installation was one of great interest to Messrs. Parry & Co., who hoped by similar means to greatly extend the area of sugar-cane cultivation in the South Arcot district, an arrangement was finally come to with them, whereby for a period of two years they undertook the management of the installation and agreed to bear all the working expenses and to make such arrangements with the ryots in regard to cultivation as they could. The result has been very satisfactory. Between August 1905 and 1st April 1906, the engine was worked for 813 hours 21 minutes on an average lift of $13\frac{1}{2}$ feet. The average discharge of the pump was about 24,000 gallons per hour and the cost of working equivalent to 5,800 cubic feet of water lifted one foot for one anna. After the rains were over, it was found that the ryots in the immediate neighbourhood were willing to pay water-rates up to as much as Rs. 5 per acre per month for the irrigation of paddy and groundnut crops as they found it cheaper to obtain a supply of water from the pumping station than to employ coolies to lift it from their own wells by means of a piccotah. This result is one of very great importance in establishing the proposition that well cultivation is at any rate in some districts limited by the resources of the ryots and not by the supply of water. Subsequent observations in this part of the country lead me to think that only a small portion of the total available supply of underground water is at present used and the reason that more is not used is that the cost of raising the water becomes prohibitive when current market rates for labour have to be employed.

Cuddalore.—In February 1901, I arranged with Mr. Devanayagam Mudaliar to provide him with a 3½ H.P. engine and a 3" inch pump to raise water from a well on his lands near the banks of the Penniar river. The original well was only 12 feet in diameter and he undertook to sink another one alongside of it 20 feet in diameter. Whilst the work was in progress Mr. Devanayagam died, but his brother Mr. S. Pandurangam Mudaliar took it up and has carried it on ever since, displaying in the development of the resources of his land the greatest possible energy and enthusiasm. At the beginning of the year the new well had been sunk and the supply of water was fairly satisfactory, but the average lift was 27 feet which was a heavy strain for a 3½ H.P. engine driving a 3" pump. When Mr. Pandurangam Mudaliar had satisfied himself that irrigation by pumping was a profitable way of investing money, he decided to return to us the 3½ H.P. engine and the 3" pump and to instal at his own expense a 9½ H.P. engine and a 4" pump. This was done and the work of erecting the same was undertaken by one of my subordinates. It was obvious however that the water-supply to the well was insufficient to give anything like full employment to a 4" pump and in the early part of this year Mr. Pandurangam Mudaliar employed some well-borers from Pondicherry to put down a bore-hole at the bottom of one of his wells. I may mention that last year we put down one to a depth of 50 feet without any result, but the second attempt with the Pondicherry men proved much more successful as, at a depth of 56 feet below the bottom of his well, water under pressure was tapped and it came up the pipe into the well and filled it up to within 13 feet of ground. After a few days' pumping, however, the supply decreased and it now amounts to about 140 gallons per minute. A second bore-hole put down at first yielded a good supply of water, but after a few days it fell off and the supply is now comparatively small and it is now intended to put this bore-hole still deeper when possibly the supply will improve. The work of Mr. Pandurangam Mudaliar in connection with these borings is very interesting and may become of great importance as it reveals the existence of sub-artesian water in the immediate neighbourhood of Cuddalore. During the year the 3½ H.P. engine and the 3" pump were worked for 915 hours at a cost of Rs. 372-7-0 and the cost of lifting water was 5,000 cubic feet lifted one foot high for one anna. The 9½ H.P. engine and 4" pump worked 639 hours at a cost of Rs. 478 or at the rate of 12 annas per hour; this on an average lift of 27 feet is equivalent to 6,750 cubic feet lifted one foot high for one anna. The total quantity of water lifted during the year amounted to 3,017,000 cubic feet whilst the area under cultivation was 14·78 acres. The land therefore received 4·7 cubic feet of water over the whole surface. The total expenditure amounted to Rs. 1,757-11-0 and the gross income to Rs. 1,943, the small profit actually realized being due to the fact that the system of intense cultivation has just now been introduced on the farm and requires more than one year for the realisation of the full return. Notwithstanding the unusual dryness of the present season, the area under cultivation has now reached 25 acres and it is Mr. Pandurangam Mudaliar's intention to gradually extend the cultivation till either all the land he possesses is fully cultivated or the limit for which the water-supply is possible is reached. In addition to the cultivation at Cuddalore, Mr. Pandurangam Mudaliar has a second pumping station at Siruvanur about 10 miles west of Villupuram. Here he has an ordinary well sunk into a bed of sand which yields sufficient water to keep a 4" pump at work. The place is somewhat inaccessible and I have only been able to visit it once. At that time cultivation had not yet been started and it is only recently that work has been seriously taken up. I understand that Mr. Pandurangam Mudaliar has only a share in this property and the other members of the family have to be consulted before new developments can be undertaken.

Kattalai.—In G.O., No. 533, Revenue, dated 25th May 1904, it is stated "Government are pleased to permit M.R.Ry. Tota Ramanujam Chettiar to pump water from the Cauvery near the village of Kattalai for the purpose of irrigating his land. He will be allowed to take water free of charge for five years, at the termination of which period water-rate will be levied under the rules applicable to the case". Acting on this Government Order Mr. Tota Ramanujam Chettiar has erected with the assistance of this department a 25 H.P. Hornsby. Akroyd oil-engine and a 12" pump. Previous to the issue of this Government Order I designed for Mr Tota Ramanujam Chettiar a pumping station consisting of a 25 H.P. engine and a 12" centrifugal pump, the whole to be erected on the padigai inside the river flood bank and the water raised from the river to be carried through the bank by means of a culvert. The plant was ordered from England, but the steamer conveying it became a total wreck on the Spanish Coast and a good deal of delay was thereby caused so that on my return from furlough the pumping station had not been completed. In the original design the 25 H.P. engine was provided to drive the pump direct, but this was modified in my absence by the introduction of a countershaft and the addition of an 8" pump which Mr. Tota Ramanujam Chettiar happened to be the possessor of. At the time the installation first began to work, the water in the river was unusually low and the engine did not work satisfactorily. The difficulty of finding out what was the matter was greatly enhanced owing to the indicator with which our investigations were made having been supplied by the makers with incorrectly marked scales, and it was only when the errors in the indicator were discovered that proper remedies could be applied. Without going into details it was found that the engine was considerably overloaded when the water in the river was low and that this was partly caused by the introduction of the countershaft and partly by a too sanguine estimate of the minimum water-level in the Cauvery river. The installation is now worked with the 12" pump when the water in the river is fairly high and with the 8" pump when the water-level is low. In practice the result is satisfactory as the area under

cultivation during the dry months of the year is much smaller than during the flood season when the whole of the land is under cultivation During the year commencing with August and ending with February the engine worked on 70 days for 665 hours and supplied water to about 180 acres of land. The volume of water lifted from the river was about 16,000,000 cubic feet and the cost of working, including interest and depreciation, at the rate of 6,500 cubic feet lifted one foot for one anna. Had the pump worked a greater number of hours the cost would have been proportionately lower. During the greater part of the season the water-supply was derived from the Amaravathi spring channels, but this supply though abundant at times was precarious and insufficient to bring the crop to maturity. The land was cultivated by lessees who sublet it and it is not practicable to give actual figures regarding the increase in yield due to the employment of the engine and pump. But a comparsion of the 180 acres irrigated by the engine and pump with lands under the same spring channel shows that the gross yield increased by about Rs. 10,000, whilst the working expenses amounted to Rs. 1,266. The total capital outlay on the whole installation was about Rs. 14,000. Allowing for increased cultivation expenses which it is impossible to estimate, there is no doubt whatever that a very good return on the installation was secured even during the first year of its working, but owing to old leases being still in force Mr. Tota Ramanujam Chettiar only secured a comparatively small proportion of the profit.

Nellikuppam.—Mr. Tilla Govinda Gramani, a ryot at Nellikuppam, obtained a loan of Rs. 3,000 under the Agricultural Improvement Loans Act and a loan of Rs. 2,000 under the Land Improvement Loans Act. A well has been sunk on his land 20 feet in diameter and a 9½ H.P. engine and 4″ pump erected. The supply of water has proved extremely satisfactory and he is able to keep the engine and pump running as long as he likes, which means that the well is capable of yielding between 300,000 and 400,000 gallons of water a day. In addition to the pump a mill for crushing sugarcane has also been installed and the engine can drive either. I am not sure that the arrangement will prove satisfactory as I expect that the irrigation under the pump will necessitate pumping all through the sugarcane season and that no power will be available to drive the mill. Eventually therefore it seems likely that either another engine will have to be provided to drive the mill or that the mill will remain practically unutilised. Native agriculturists are very keen about having combinations of this kind, but I am totally opposed to them and it was only because Mr. Tilla Govinda Gramani had purchased the mill before he came to me about the engine and pump that I agreed to give the arrangement a trial. A much more satisfactory arrangement is to provide a sugarcane mill and a rice huller to be driven by one engine, the former being used during the sugarcane season and the latter during the rest of the year.

Kadiampatti.—The engine and pump at this installation belong to Government and part of the working expenses were met by the department during the year, the total expenditure amounting to Rs. 739–3–10. The installation consists of a 6½ H.P. engine and a 4″ pump and it was installed early in 1904. During the whole of the first season the installation worked so badly that Mr. Anderson, the owner of the land, watered by the pump, was involved in considerable pecuniary loss. Immediately after taking over charge on my return from furlough I went down to Kadiampatti and put the installation in good working order and since then it has given no trouble. The unsatisfactory working was due to changes in the design of the plant whilst I was on furlough, which resulted in trying to make the engine work at double its designed power. The history of this plant is interesting as showing how easy it is to get into a hopeless muddle when slight defects are wrongly diagnosed. This installation draws its water from a well which was specially sunk for it by Mr. Anderson on the banks of a ravine through which the drainage of a small valley in the Shevaroy hills passes. As the percolation into the well did not realise Mr. Anderson's anticipations, an adit was run into the ravine at a sufficiently low level to draw off any water coming down. From June to December there is a very good water-supply, but in the early months of the year the supply falls off and in March, April and May it is only sufficient for a small area. During the year the engine was run on 272 days for 1,877 hours and about 33 million gallons of water were raised an average lift of about 20 feet. A great variety of crops were cultivated and many of them resulted in an unsatisfactory return, especially there was a heavy loss on the plantain cultivation, owing to the failure of water-supply during the hot weather. It is not worth while quoting the figures I have obtained from Mr. Andersen, as many of them are comparatively rough estimates, but he has supplied me with sufficient information to show that on the whole the employment of the engine and pump was fairly profitable and he is sanguine that this year he will be able to obtain very much better results profiting by the experience of the last two seasons.

Coimbatore Jail.—This installation is interesting in many respects. It was entirely erected by the Public Works Department and handed over to us in working order. The engine is a 6 H.P. Ruston Proctor oil-engine which will only work with kerosine oil. The pump is a double plunger pump locally made by Messrs. Massey & Co., and it works on an average lift of 62 feet. Mr. Gadsden, the Superintendent of the Central Jail, has kindly furnished me with the following figures. The pump was worked for 1,630 hours and raised 5,343,000 gallons of water. The land under the pump yielded produce to the value of Rs. 958 and the working expenses including Rs. 490–12–6 for kerosine came to Rs. 727–11–6. If it had been possible to use liquid fuel,

the profit on the installation would have been more than doubled. The water-supply to the well is about sufficient to keep the engine and pump at work for five hours a day and it is possible that it might be further increased either by running out horizontal adits or by deepening the well.

Manamadura.—This installation was erected at a well sunk about half a mile to the south of the Vaigai river near the Manamadurai Railway station. The land was acquired by the Madura District Board for an experimental farm and was handed over for working to the Rev. C. S. Vaughan of the American Mission. Unfortunately the soil was in a poor condition and Mr. Vaughan has not had at his command sufficient funds to do justice to the enterprise so that it has resulted in a failure, and the engine and pump are now being removed to be erected elsewhere. The only result of any practical value which has been obtained at this Manamadura installation is the fact that from a well 12 feet in diameter sunk to a depth of only about 16 feet it has been possible to extract as much water as a 3″ pump working continuously could lift. The water-level in the well varied about 18″ during the year and though the engine was only worked for 830 hours there is but little doubt that it could have been worked continuously and that at least a quarter of a million gallons of water per day could have been obtained from this source or sufficient for probably 100 acres of sugarcane or plantains in that neighbourhood.

Bezwada.—The District Board have opened a demonstration farm in the immediate neighbourhood of Bezwada on land between the Ryves' and Ellore canals and to supply it with water an engine and pump have been erected, the supply of water being obtained from the Ryves' canal. The engine is one of 3½ H.P.and the pump a 3″ Worthington, similar to that put down at Melrosapuram. The engine commenced working in August and up till the end of March had been run for 1,472 hours at a cost of Rs. 890-15-0 which includes Rs. 335 for interest and depreciation on an expenditure of Rs. 2,682. The average lift was 19½ feet and the discharge about 10,000 gallons per hour. The cost of working was at the rate of 3,200 cubic feet lifted one foot high for one anna.

Chittatur.—This is a private installation erected for Mr. P. Appasawmi Mudaliar with a loan of Rs 5,000 under the Agricultural Improvement Loans Act. The water-supply is derived from the Adyar river on the banks of which a well has been sunk and connected by a brick culvert with the lowest portion of the river-bed. The engine is a 14 H.P. Hornsby and and the pump a 5″ Gwynnes centrifugal, being that which was removed from the well at Attur to which reference has already been made. The area of land owned by Mr. Appasawmi Mudaliar amounts to about 100 acres, but as the engine and pump were only started in February, the area brought under cultivation is not yet very large. The capacity of the pump is about 24,000 gallons per hour and at present it is being run from 8 to 10 hours daily. As Mr. Appasawmi Mudaliar is the retired Head Accountant in the Inspector-General of Police office, he understands keeping records properly and as he has promised to maintain the registers which have been drawn up, next year we ought to secure some useful information regarding the duty of water on his land.

Trichinopoly junction.—In the early part of last year the late Hon'ble Mr K. Vasudeva Aiyangar of Srirangam purchased a 3½ H.P. engine and a 3″ pump which were erected at a well on some land belonging to him near the Junction station. The well was a very old one and had fallen into ruins. When first inspected it was found to be 24 feet square and contained about 16 feet of water. It was emptied by the pump in a comparatively short time and the springs were found to yield but a very unsatisfactory supply of water about 25,000 gallons per day during the cold weather and about 15,000 gallons a day in the dry months of the year. The Honourable Member undertook the work of improving the well himself and deepened it all over to the extent of 8 feet and on the west side he enlarged it by 9 feet, making it a rectangle 33 feet × 24 feet and 26 feet deep. On this work he expended Rs. 750 and without much result. I was unaware that he was doing this, otherwise I should have advised him to have confined the deepening to a much smaller area and not to have enlarged the well at all This is a case where two or three borings might have been put down at a very small expense and would have yielded a great more information than has so far been obtained. Quite recently I received a long letter from the late Honourable Member discussing what might be done to improve the supply to this well and asking me to come down and see it and finally settle what should be done. I accordingly made an appointment with him, but on my arrival at the Trichinopoly station I heard of his untimely death on the previous day. I understand that his sons take considerable interest in this method of irrigation and it is probable that they will continue the work begun by their father.

The other pumping stations which have been erected possess no unusual features and none of them have been at work long enough for any results regarding the duty of water to have been obtained.

TABLE I.—Expenditure on pumping stations.

—	1903–1904.	1904–1905.	1905–1906.
	RS. A. P.	RS. A. P.	RS. A. P.
Cuddalore	1,530 0 0	435 6 2	284 2 0
Kadiampatti..	2,426 9 6	1,380 10 4	739 3 10
Manamadura	1,640 0 0	939 2 1	809 4 10
Saidapet	2,850 0 0	678 9 9	254 12 4
Attur..	5,200 0 0	3,083 1 7	1,645 13 1
Melrosapuram	..	517 14 9	3,160 1 4
Villupuram..	..	1,089 12 6	3,672 1 9
Pandur	..	.. .	128 10 0
General account	..	1,629 3 6	2,944 4 6
Establishment	..	4,643 14 4	7,917 8 9
*Miscellaneous	..	..	355 3 6
Total ..	13,646 9 6	14,397 11 0	21,908 1 11
Total expenditure 1903–1906 ..	Rs. 49,952-6-5.		

	RS. A. P.
*Coimbatore	117 12 6
Talaparamba	119 13 0
Koilpatti	65 12 0
Hagari	51 14 0
Total ..	355 3 6

Expenditure by Public Works Department.

	RS.
Coimbatore Jail	5,304
Melrosapuram	4,064
Attur	1,996
Villupuram	3,717

TABLE II.—Cost of establishment from April 1905 to March 1906.

Designation.	Salary.	Travelling allowance.	Total.
	RS. A. P.	RS. A. P.	RS. A. P.
Supervisors	*5,227 2 3	1,570 11 6	6,797 13 9
Sub-overseer	420 0 0	187 0 6	607 0 6
Peons	178 0 3	334 10 3	512 10 6
Total ..	5,825 2 6	2,092 6 3	7,917 8 9

			RS. A. P.	RS. A. P.
Supplies and Services—				
Purchase of machinery			2,327 13 0	
Repair of „			634 4 0	
Maintenance of „			1,586 0 3	
Wages			1,239 14 5	
Materials			2,246 6 8	
Tools and plant			4,731 4 8	
Petty works of construction			323 14 0	
				13,089 9 0
Contingencies—				
Petty repairs			412 5 8	
Telegrams			28 4 0	
Postage			50 1 0	
Tour charges			72 7 0	
Office expenses			326 10 0	
			11 4 6	
				901 0 2
		Total ...		13,990 9 2

TABLE III.—Expenditure on pumping installations and general head of account, 1905–1906.

—	Purchase of machinery.	Repairs of machinery.	Maintenance of machinery.	Materials.	Wages.	Tools and plant.	Petty construction.
1	2	3	4	5	6	7	8
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1. Mánámadurai ..	..	51 0 0	274 4 3	314 9 8	105 2 9	4 1 4	..
2. Kadiampatti ..	..	66 4 0	50 14 6	387 11 9	104 0 0	102 5 7	..
3. Attur	..	66 8 0	341 6 0	431 4 6	598 7 0	131 7 4	..
4. Villupuram ..	2,253 0 0	..	714 2 6	119 1 3	257 6 8	4 1 4	323 14 0
5. Melrosapuram ..	..	90 4 0	52 15 0	331 14 0	9 8 6	2,279 7 9	..
6. Cuddalore	..	96 12 0	103 14 0	10 4 0	..	50 0 0	..
7. Saidapet	..	223 12 0	3 0 0	20 8 0	..	4 1 4	..
8. Pandur	..	..	..	102 9 0	..	..	..
9. Hagari	..	..	27 6 0	..	..	..	..
10. Koilppatti	..	..	..	0 8 0	22 13 0	..	..
11. Taliparamba ..	..	..	..	0 2 0	94 1 6	..	..
12. Coimbatore ..	..	..	..	46 10 6	48 7 0	5 8 0	..
13. General	74 13 0	39 12 0	18 2 0	481 4 0	..	2,150 4 0	..
Total ..	2,327 13 0	634 4 0	1,586 0 3	2,246 6 8	1,239 14 5	4,731 4 8	323 14 0

—	Repairs.	Office expenses.	Tour charges.	Telegraph charges.	Miscellaneous.	Postage.	Total.
	9	10	11	12	13	14	15
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1. Mánámadurai ..	50 14 10	9 4 0	..	..	..	..	809 4 10
2. Kadiampatti ..	..	28 0 0	..	..	..	..	739 3 10
3. Attur	18 6 3	58 6 0	..	..	..	..	1,645 13 1
4. Villupuram ..	..	..	0 8 0	..	..	..	3,672 1 9
5. Melrosapuram ..	333 3 7	51 12 6	11 0 0	..	..	..	3,160 1 4
6. Cuddalore	..	23 4 0	..	..	..	..	284 2 0
7. Saidapet	..	..	0 7 0	..	..	..	261 12 4
8. Pandur	..	26 1 0	..	..	..	..	128 10 0
9. Hagari	..	..	24 8 0	..	..	..	51 14 0
10. Koilpatti	9 13 0	32 10 0	..	..	..	..	65 12 0
11. Talipparamba ..	..	10 7 0	15 2 6	..	..	..	119 13 0
12. Coimbatore	..	13 7 0	3 12 0	..	..	..	117 12 6
13. General	..	68 3 6	17 1 6	28 4 0	16 7 6	50 1 0	2,944 4 6
Total ..	412 5 8	321 7 0	72 7 0	28 4 0	16 7 6	50 1 0	13,990 9 2

MADRAS,
9th June 1906.

(Signed) A. CHATTERTON,
Professor of Engineering,
on Special Duty.

APPENDIX IV.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST.

I have the honour to present the following report of the work done in my office during the year 1905–1906.

2. The work of the Government Botanist has undergone a further modification during the year. Agriculture and farm management and the various matters connected with the expansion of the Madras Agricultural Department have occupied most of his time. The acquisition, laying out and management of three considerable Agricultural stations, all of them undermanned, have left little time for the more scientific aspects of the Government Botanist's duties. At the same time the addition of fieldmen to the staff has had the desired effect, in that the work of the Assistants in their various branches, systematic botany, economic botany, mycology and entomology, has been less interfered with than was the case last year. The office has, however, been very seriously undermanned, especially in the clerical section, where although the work has nearly doubled, no increase of clerks has been sanctioned. Added to this, there has been an unusual amount of sickness right through the office and the whole of the work of the official year has been conducted under the greatest difficulties. These facts have seriously militated against the careful inspections which formed such a marked feature in the work of the Samalkota farm in previous years and which it was intended to introduce at Palur and Taliparamba.

Numerous changes in the office arrangements have been necessary at various times owing to alterations in the character of the work and additions to the staff. The work of rearrangement of the collections, commenced last year, has been completed. The additional microscopic room has been finished and is at present devoted to the Mycological Assistant. The Entomological room was found to be infested with white-ants and had to be refloored. The main room was without ventilation and too dark and sky-lights have been added. A Mycological Assistant, an additional Entomological Assistant and a Librarian have been added to the staff.

3. The Government Botanist spent 206 days away from head office and, on account of ill-health, was obliged to use to its full extent the sanctioned transfer of his office to the hills for two months. Seventeen visits were paid to the three Agricultural stations under his control. A tour in the Wynaad was devoted to the study of the cultivated and indigenous peppers. The latter were also studied and collected on the *Tambracherry ghaut* and in the *Palnis*. Two visits were paid to the small experimental farm at *Vadagarai*. Several visits were made to *Coimbatore* in connection with the founding of the Central Research station of the department while the farms at *Pittâpur* and *Melrosapuram* were also examined. As in the previous year the Government Botanist attended the *Pusa* Agricultural Conference in January, spending four days at the *Royal Botanical Gardens* at *Sibpur* and the *Museum* of the *Reporter on Economic Products en route.*

The Assistants and fieldmen spent altogether 536 days on tour. Besides numerous visits to all the three farms, tours were made in *Vizagapatam* for the study of jute, *Mysore* for the collection of the sandal flora, *Travancore* for collecting specimens for Kew, *Udamalpet* for the study of a serious outbreak of disease in horsegram (*Dolichos biflora*), *Attur* to study and combat the pests of the cotton plant, *Melrosapuram* for the inspection of land for a proposed sugarcane nursery, *Tanjore* to attend the Agricultural and Industrial Show, *Kodaikánal* for the collection of grasses and peppers, and the slopes of the *Palnis* for various other collections.

One of the farm officers toured over the *Gódávari* district assisting Dr. Butler in the study of the palmyra disease, and prepared a village map of the affected area. He also made two tours through the taluks of the district to note the relative merits of the new and the local canes. The Taliparamba officer examined the pepper cultivation in thirty villages of the *Chirakkal* and *Kottayam* taluks. Besides this numerous visits were paid by the various members of the staff to the *Saidapet farm* for the collection of specimens of economic plants and the study of various diseases.

4. The work in *Systematic Botany* has been of a varied character. The whole collection has been kept thoroughly cleaned during the year. The sheets "not yet added to the herbarium" have been completely rearranged for ready reference. This necessary work was somewhat laborious as the number has now reached over 10,000 sheets. A very large number of sheets have been mounted during the year. Of these the chief collection was that of *peppers* with 679 sheets while the *balsams* numbered 115. Of other plants 3,825 sheets were mounted, bringing up the total to 4,619.

The *balsams* (*Impatiens*) received some attention and further collections were forwarded to Sir Joseph Hooker for determination. The results were unexpectedly interesting in that some ten new species were discovered to occur in South India.

The *sandal* (*Santalum album*) flora collected in the typical Mysore zone was worked out by the Assistant.

A very large number of *peppers* (*Piper nigrum*) was collected and worked out by the Government Botanist, chiefly from the Nilgiris, the Tambracherry ghaut and the Wynaad, the Palnis and the Anamalais. Valuable drawings of the more important species were added to the collection.

The flora of the Taliparamba farm received marked attention, the trees and shrubs growing on the farm being collected and named.

A collection of the different species of *barberry* (*Berberis*) was made for Mr. Drummond, I.C.S., chiefly from the Nilgiris, and a set of the seeds of *sundew* (*Drosera*) was obtained for an American correspondent.

The whole collection the *Gentians* (*Gentianaceæ*) was forwarded to the Reporter on Economic Products for naming. Part of the collection of ebonies (*Diospyros*) sent to Calcutta for the same purpose was returned. The *Lemon grasses* (*Andropogon Schœnanthus* and *A. Nardus*) were also forwarded to Calcutta and afterwards to Kew for similar treatment.

A special expedition was undertaken to the Travancore hills for the collection of germination stages of *Ochlandra travancorica*. This was done at the instigation of Sir Joseph Hooker and the results were the formation of a very fine collection in spirit of all stages, which was forwarded to Dr. Stap at Kew.

A special study was made of the Madras *root-parasites* and their hosts, the latter being named by the Assistant. A very large collection of the root connections (haustoria) was made in spirit for future work. This was chiefly of *Santalum*, *Osyris*, *Thesium*, *Olax*, *Cansjera* and *Ximenia*. A first paper on the sandal haustoria was sent to the Editor of the Pusa memoirs in September.

Numerous minor lots of plants were named for correspondents, largely Forest officers, during the year. Among these was a set of plants forwarded by the Collector of Malabar from the *Laccadives*.

Two hundred sheets of plants were forwarded to the Director of the Botanical Survey for incorporation into the local floras of the Calcutta herbarium, and forty Calcutta sheets were received in exchange from him.

5. The work in *Economic Botany* has been found inseparable from that of the farms. No definite agricultural tour by the Government Botanist has been possible in the year, and the work has been more or less desultory. Now that the farms are established and are to have adequate staffs, the Assistant in Economic Botany should be freed for more definite work in this direction.

A considerable amount of correspondence has taken place in connection with stocking the farms with various seeds and, from the nature of the case, this work has fallen on the head office staff. Varieties of pepper, groundnut and sugarcane have been obtained from different parts of India and the world, lemon grass roots (*Andropogon Schœnanthus* and *A. Nardus*), guinea-grass *Panicum maximum*), cottons of various kinds, paddy, cholam (*Andropogon sorghum*), Mahogany (*Swietenia mahagoni*), teak (*Tectona grandis*), rain trees (*Pithecolobium saman*) and so on have been continuously collected and forwarded during the year.

A small garden has been made in the office compound, and this has been enclosed and tended. In spite of all precautions, however, it has been found impossible to keep it free from trespass and the labels are frequently torn out and even plants removed. This matter has caused considerable annoyance and has entailed a good deal of work during the year.

Advantage has been taken of the nearness of the Saidapet farm for the study of many plants and their diseases. During the year most attention has been given to cottons growing there and sugarcane, but all sorts of diseases have also been examined *in situ* and in the laboratory. No actual cultivation has been undertaken at Saidapet under the Government Botanist's control, as was done formerly.

The lemon-grasses (*Andropogon Nardus* and *Schœnanthus*) have received rather special attention during the year. The naming of the sub-varieties was found impossible in our office, and the whole collection, after specific naming in Madras, was sent first to Calcutta and finally to Kew for careful working over. It is felt that for the proper understanding of the value of the different varieties, they must be authoritatively named, and the present large collection if thus treated will form a valuable basis for the study of this important product.

A similar but much more difficult piece of work was the naming of the "*Mauritius canes*" which have crept into our Agricultural stations. These were all carefully examined for botanical differences in the field, they were then measured and drawn. The painting of previous years was completed and the canes were analysed. All these results and two-foot pieces of all the varieties were sent over to the Director of Forestry in Mauritius for determination, if possible. The results will be eagerly awaited, for the confusion that has arisen by different names being given to the same cane is likely to seriously interfere with the distribution of the best kinds. Another piece of work connected with sugarcane was the preparation for the Inspector-General of Agriculture of a scheme for enquiry into the sugarcane industry to be conducted by the various Provinces in preparation for the next meeting of the Agricultural Board.

The *Peppers* of the Peninsula have received a good deal of attention and some progress has been made towards the naming of all the wild forms and the determination of the species which have given rise to those cultivated. The work is extremely complicated and the specimens will probably need comparison with European collections before it can be completed.

6. In *Entomology* the staff has been increased during the year by the addition of a second Assistant. As he was at once sent to Pusa for training this has made no difference in the available assistance in this branch of work. On the whole the work in Entomology has not been satisfactory. A considerable number of pests have been passed under review, but the Assistant has made little progress in working out life-histories in the field.

The Barbados canes which were found to be infested with *mealy-bug* were treated with kerosine emulsion. The groundnuts at Saidapet were studied for *surul-puchi* (*Anacampsis nextoria*), but the results were inconclusive. The Assistant was sent down to the Palur farm to make a more thorough study of this serious pest but no practical results were recorded. The indigos at Saidapet were reported diseased and investigation showed the presence of *aphides*. The exotic cottons at the Agri-Horticultural gardens were examined for *boll-worm* with which they were seriously infected. An attack of *millipedes* on the groundnut at Palur was reported by the farm officer and the Entomological Assistant was sent down to investigate it. It was proved that the *millepedes* really did eat the kernels but nothing was learnt of their relative abundance in the different plots. Spraying was done with salt but the results were not clear. An attack of a serious nature being reported from Udamalpet on the local horsegram (*Dolichos biflora*) the Assistant was deputed to work out the pest, but he did not succeed in getting any trace of the insect, as the attack was over. The Assistant was despatched to Attur to conduct spraying experiments on the cottons growing there, but the results have not been reported. A similar spraying was done on the cottons in the compound of Messrs. Binny's factory. *Scale insects* were examined on prickly-pear from Tenkasi, *caterpillars* on paddy from Saidapet, *boll-worms* on cotton

from Proddatur, *acari* on cotton from Samalkota, *Lecanium* on *Ocimum sanctum* from Madras, cucumbers attacked by *caterpillars* in Bezwada, *caterpillars* defoliating *cycas* in Madras, *galls* formed by *scale insects* on *Acacia leucaphlœa*, *Mytilaspis* on pepper from the Wynaad and many minor matters.

The office obtained some considerable increase in appliances during the year and the Assistant was instructed to study the various spraying apparatus and given every opportunity for using them. It is not likely, however, with the Government Botanist's many other duties, that any great progress can be made until the Assistant returns from Pusa. A considerable addition to the fieldmen will then be necessary before any practical field operations can be attempted.

7. The study of *Mycology* has taken more definite form in that an Assistant in this subject was added to the Government Botanist's staff in November 1905. It was urged that, when the proposed European Mycologist arrives, it will be of advantage for him to find some one of his Assistants already *au fait* with the commoner Madras fungus diseases. The new Assistant is to be trained by Dr. Butler at Pusa, but was, at his request, retained in Madras for preliminary study.

The whole of the collections of plant diseases were separated from the general economic collection and placed in two rooms which are devoted to Entomology and Mycology respectively. The fungi in these collections were arranged and cursorily examined by the new Assistant after his entertainment.

Owing to the serious outbreak of disease on the Samalkóta Sugarcane farm (primarily due to the exceptionally severe weather) the Mycological Assistant was deputed to make a thorough study of it and other pests on the farm. He spent about ten weeks there altogether and, besides making himself thoroughly acquainted with the sugarcane diseases, observed and wrote reports on similar outbreaks of fungus diseases in red-gram (*Cajanus indicus*), chillies (*Capsicum frutescens*), green-gram (*Phaseolus Mungo*), cow-peas (*Vigna catiang*) and sunn hemp (*Crotalaria juncea*). Other diseases reported to this office of a fungus nature included the following:—a disease on tomatoes due to a *macrosporium*, *rusts* on indigo and cumbu (*Peninsetum typhoideum*), and diseases on paddy of doubtful nature. It may be pointed out in this connection that not a few cases have occurred of specimens sent to this office arriving in an entirely unsuitable condition for examination. A memorandum on the preservation and forwardal of specimens to the Government Botanist's office has been prepared and widely distributed. I regret to say that the influence of this circular has been practically *nil*, and that specimens of all kinds continue to arrive in a condition absolutely unfit for examination or preservation.

The diseases caused by fungi which have received special attention during the year are those of the farms, sugarcane, pepper and ground-nut, while the outbreak of a serious disease in palmyras (*Borassus flabelliformis*) has also occupied us a good deal.

The *sugarcanes* of the Gódávari district have, on account of the failure of rains during the year, suffered wholesale from disease. Probably some 5,000 acres have been destroyed. The canes reared in the Samalkóta farm and widely distributed during recent years have, it is satisfactory to remark, proved far better able to cope with the drought and attendant disease than the local kinds (which have been annihilated in the Peddápur taluk), but, all the same, none of the varieties collected on the farm have proved themselves perfectly immune. A very careful map of the place of origin and spread of the disease in all the plots at Samalkóta was prepared by the Mycological Assistant, and has been recorded for comparison with future observations of the same kind. The whole of the sets replanted on the farm have been carefully examined by him and none but apparently sound sets have been planted for the next year's crop.

Upon the recommendation of Dr. Butler an attempt was made at *inoculating healthy pepper* plants with the fungus lately described by him as causing the current disease in the plantations. For this purpose a special officer was sent to the Wynaad, who brought down a fine collection of living plants of all ages, from ungerminated seed to vines several years old. These were planted in large pots in the office compound. An Assistant from Dr. Butler's office was despatched and he inoculated the vines, but unfortunately succumbed to an attack of dysentery and left after a few days. The matter is here recorded because, although unavoidably frustrated, it caused a great deal of work and demonstrated the possibility of bringing such plants safely to Madras and rearing them there, where conditions of isolation, etc., are ideal. The vines on the pepper farm at Taliparamba which have died during the year have been carefully noted. It is usual that such deaths occur in patches, several together, and all such spots have been carefully marked and numbered as "disease spots" for further detailed study. The Mycological Assistant has cut many sections of dead pepper vines to make himself thoroughly acquainted with the appearance of the disease.

In *ground-nut* the disease called "Tikka," not hitherto regarded as a very formidable disease in South Arcot, has made rather a formidable appearance during the year—this also probably being influenced by the exceptional weather. It has been carefully noted, and certain varieties have been marked as specially liable to the disease. A preliminary spraying with Bordeaux mixture was performed but more for practice than anything else because of the nearness of the outbreak to the harvest. As before, the appearance of the disease has been carefully studied by the Assistant under the microscope.

A few isolated collections of fungi were made at Kodaikánal and forwarded to the Mycologist at Pusa. A serious disease having made its appearance among the palmyras (*Borassus flabelliformis*) in the Gódávari district, the Government Botanist was deputed to investigate it. He examined a number of trees on the spot and afterwards examined their tissues under the microscope. There being marked evidences of a fungus disease the matter was referred to Dr. Butler for investigation. Dr. Butler himself visited the plantations and an officer was deputed to accompany him. The latter prepared a careful map of all the villages of the infected areas (the two taluks of Ramachandrapuram and Cocanada) and this was forwarded to Dr. Butler. The disease appears to be caused by a species of *Pythium* new to science and Dr. Butler has proposed certain remedial measures which are under consideration.

8. There are three Agricultural stations under the direct management of the Government Botanist, the *sugarcane farm* at *Samalkóta*, the *ground-nut* and *sugarcane farm* at *Palúr* and the *Pepper farm* in *Taliparamba*.

Work upon all of these has been continuous throughout the year, there being no period of rest, as is usual in dry-crop farms. This work has been particularly heavy during the year under review. Besides the growing of the crops and the recording of results, plans have been prepared in most cases for future lines of experiment, the freshly acquired land has been laid out. Levelling, removal of bunds and trees, regulating water-channels, making roads, paths, bridges and culverts, preparing plans for and erecting buildings of various kinds and enclosing the area in fences, and other work of a fundamental character has been successfully carried out.

The actual work on these farms has been already adverted to in the administrative reports and as the scientific results will be dealt with in another series of reports, it is presumed that nothing further is required on the subject here. It may be noted, however, that, in place of the full complement of nine men for the three farms only four men were entertained during the year, and these not from the beginning, rendering the work of great difficulty all round. As the fieldmen attached to the Government Botanist's office were largely employed in supplying vacancies on these farms, the following notes as to their work are appended :—

Of the *three fieldmen* sanctioned for the Government Botanist's office, one was entertained throughout the year, the second joined duty on April 16th, while the third was appointed in the middle of August.

The *senior fieldman*, having been transferred from the Overseership of the Nilgiri Parks and Gardens, was placed in charge of the Taliparamba farm in the absence of a permanent incumbent, and conducted it for the first four months of its existence. Owing to short-handedness at Samalkota he was deputed to draw up plans and estimates for the laying out of the farm and the buildings there. On leave being granted to the Agricultural Inspector, he was placed in charge for six weeks. He was deputed to Palur to assist in reaping the groundnut crops in August. All the estimates for the buildings on the farms were prepared by him during the year. Owing to the many calls on the Government Botanist's time, it has been found necessary to depute an Assistant at Head Office to deal with matters connected with the farms generally, and the senior fieldman was set apart for this work in the middle of December, and has thus freed the Economic Assistant for other work. He was also deputed to represent the Government Botanist at the Tanjore Agricultural Exhibition.

The *second fieldman*, after being trained in the office and having acted on several occasions in charge of the Palur farm, was posted as Assistant Agricultural Inspector there in the beginning of January in the absence of an agricultural probationer sanctioned. The place of the second fieldman thus rendered vacant was not filled up during the remainder of the year.

The *third fieldman* joined the office in August. He was sent to the Taliparamba farm for a month in order to allow the agricultural probationer in charge to tour in the chief pepper taluks. He was afterwards placed under the Assistant in Systematic botany to work out the flora of the Taliparamba farm and help in the rearrangement of the sheets of the herbarium.

9. The *Library* in the Government Botanist's office has been steadily increasing for some years past. Not only has marked attention been paid to getting together a series of works useful for the study of the Madras Flora, but botanical, entomological, mycological and agricultural books and periodicals of every description have been carefully sought out and added. Under direction of the Board, all the books of the Agricultural Department were brought together during the year and a librarian sanctioned. After advertisement, one was selected out of fifty candidates and he commenced his duties on January 4th. For convenience sake, the library was housed in the Government Botanist's office, and the librarian placed under his control. His first duty was to separate the books of the Government Botanist's private collection which had hitherto formed the nucleus of the office library, and had been used by all the Assistants since the commencement. A thorough study was made of the several local libraries, and reports were prepared on the *Connemara Library*, the *Library of the Madras Literary Society* and that of the *Presidency College*. A similar study was at the same time made by the Government Botanist of the Library of the *Director of the Botanical Survey at Sibpur* and that of the *Pusa Institute*. The books and periodicals received from the Board's office were found to be a good deal neglected, and much time was spent in putting them in order. At present a rough division has been made into the following classes:—*Systematic Botany*, *Economic Botany* and *Agriculture*, *Physics and Chemistry*,

Entomology, *Mycology*, *Serials* (excluding systematic botany), *Reports* and *Bulletins*. The numbers of the periodicals have been bundled together and got ready for binding. At the same time catalogues of all sorts have been looked through for useful works, and considerable additions have been made to the library. Slip catalogues have been prepared of the serials and works in systematic botany, and a list of the other works in the library is in preparation. This will ultimately be transferred to a slip-catalogue when the card index bureau ordered arrives.

10. A *pupil* from Hyderabad was trained for several months in the office under the various Assistants and visited several of the farms. He left, however, before his period of training was completed.

Several *papers* were written for publication during the year. An illustrated account of the *varieties of pepper* growing in the Wynaad plantations was prepared, and is being printed as a bulletin of the department. A note was issued on the *treatment of sugarcane in delta lands*, and this was translated into Telugu and Tamil and widely distributed. A short paper was contributed to the Agricultural Journal of India on the *work of the Samalkota farm*, and notes were also prepared on *pepper varieties*, *striga on hill-paddy* and the *groundnut pests in South Arcot*. A paper was prepared on the *structure of the sandal haustorium* for the memoirs of the Agricultural Department of India and an account of the *Vizagapatam Flora* was prepared for the District Manual.

11. The *Artist* has continued to do satisfactory work during the year. He has painted 21 sheets of canes growing at Samalkota farm, drawn 30 sheets from the Government Botanist's sketches, chiefly of wild and cultivated peppers, and sketched 13 sheets of different varieties of cotton plant from herbarium material. This latter work was largely in the nature of training. Besides this, he has spent much time on preparing and making copies of various farm maps and plans of buildings and has painted a number of labels for various purposes. The *Photographic collection* has been increased by about 100 numbers, and the whole has been brought together in a series of labelled boxes with a register of contents. As has been pointed out, an additional artist capable of doing photographic work is badly needed.

MADRAS,
9th June 1906.

C. A. BARBER,
Government Botanist.

APPENDIX V.

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I have the honour to submit the annual report of the department in my charge, for the year 1905–1906.

2. The same staff continued in charge of the College, and during the commencement of the year another Lecturer was appointed, but as he was found subsequently to be unsuitable, he was asked to revert to his former appointment, and other arrangements have been made to fill the vacancy temporarily. The Civil Veterinary Department consisted as before of six Veterinary Assistants; of those, two belong to the senior grade and others were recruited from the Bombay Veterinary College.

The numerical strength of the office establishment remained the same, but as the work has been rapidly increasing it will be necessary to augment the staff. During the year three persons were added to the menial establishment.

3. In addition to my work at head-quarters, I was on tour for 135 days or for about 4½ months, and travelled 11,015 miles by rail and 370 miles by road. I paid two visits to the chief pony-breeding centres in the Coimbatore and the Salem districts. The Veterinary hospitals in the districts of Madura, Trichinopoly, Pithápuram were constantly visited by me, and with a view to select suitable sites for the opening of other hospitals, I visited Tinnevelly, Tanjore, Ootacamund, Bellary, Rajahmundry, Vellore and Cannanore.

A hospital has since been started at Bellary. At the request of the Secretary of the North Malabar Agricultural Association I proceeded to Tellicherry and Cannanore and advised the Committee on cattle-breeding and fodder crops. I also addressed the Palghat Agricultural Association on the subject of cattle-breeding. An extended visit of over a month was made in the breeding centres of the Coimbatore district around Kollegal, and although very fine hardy cattle are bred in the locality there is room for improvement of cattle-breeding. The branch of work relating to cattle disease received my best attention, and I inspected personally most of the places where the Veterinary Assistants had been at work. Under instructions from the Board of Revenue, I proceeded to Coimbatore to attend the Agricultural Committee, and in December I went to Bombay to purchase Arab stallions for pony-breeding operations.

II.—Veterinary College.

All three classes are now being held in the new buildings which the Director of Land Records and Agriculture opened officially in October last. The total strength is now 75 students, viz., class A 30, class B 25, and class C 20. Two of the students now in class C, Iyasawmy Pillai and M. Hassain Hazari, and one student Mir Anwaruddin in class A have been exempted by Government from the educational qualification which is necessary for admission into the College. Table I.

2. The annual examinations for both the classes B and A were conducted by me personally, and 21 (including S. P. Swaminatha Aiyar of the Saidapet Veterinary hospital) and 25 passed respectively. There was only one failure in class B. In class B two students, Kumarasawmy Pillai and Hyavadana Rao, and in class A 13 students secured more than 75 per cent. of the total number of marks. The new class that has been formed during the year was examined twice by me, viz., at the end of December 1905, and again in March 1906. Advantage was taken to secure subjects from animals that died or were destroyed at the hospital for dissection purposes.

3. In order to afford students as much experience as possible in operative surgery all operations were fully demonstrated to them, and in many cases the senior students were allowed to perform operations themselves on the dead as well as living subjects under the supervision of one of the staff, so that they may become well accustomed to the methods in which the various operations have to be performed. The attendance of the students in all classes during both the terms was fair on the whole, but I regret to say that I have had to issue serious warnings to some of the students.

4. During the year the Library and the Museum were enriched by a further supply of books, veterinary models, and furniture for preserving anatomical specimens.

5. An extensive supply of guinea grass and lucerne was always available for the in-patients in the College compound, and it was of immense advantage to poor and delicate animals.

6. The students evinced active interest in the various games as in last year, and competed for the annual Athletic sports in cricket, tennis and gymnastic exercises. Special attention has been paid to the physical development of the students.

7. The Dobbin Hall has been converted into Hostel for students, and accommodation has been provided for 25 boarders. There are now 22 students in the Hostel which has become very popular. There is a comfortable reading room in the Hostel in which are papers, professional periodicals, and games for the amusement of the students.

8. There had been no illness among students nor complaint regarding their diet and I am glad to report that it has been conducted to the satisfaction of all.

III (*a*).—Cattle Disease.

The total number of deaths during the year was 90,293 from diseases and 15,301 from other causes. The difference is very slight when compared to the figures of the last year, and under "Epizootic aptha" and "other causes" the loss was somewhat less. More than 43 per cent. of the total deaths from diseases was classified under unspecified diseases. Rinderpest, diarrhœa and dysentery was responsible for 21·09 per cent. of the mortality, and anthrax 5 per cent. The deaths from the remaining contagious diseases were 20·9 per cent. approximately. Table II.

2. Rinderpest was somewhat prevalent, especially in the Ganjám, Gódávari and Kistna districts, but the number of deaths shows a decline over the figures of last year. This has been especially so in the first two districts, and it is a hopeful sign of the good which is being done by preventive inoculation. Only a very small percentage of cattle had been protected, and there had been only a very few deaths among inoculated cattle. The total deaths from anthrax was below that of the previous year. In Nellore and Gódávari districts there had been comparatively few deaths. In Tanjore there was a serious outbreak of anthrax among the cattle, and careful measures were promptly applied from the beginning, and many cattle (10,453) were inoculated. In the Kistna district there was also some noticeable loss from anthrax, but for want of information no measures were taken.

3. There is nothing particular to be said under any of the other headings except that there is still much confusion in the nomenclature of the diseases, and the regular submission of returns. It is to be regretted that this must continue, as only a few places can have the aid of Veterinary Assistants at present. Cattle mortality was severe in Kistna, Kurnool, Gódávari, Ganjám, Nellore, Anantapur, South Arcot, Madura and Bellary districts, *i.e.*, in 9 out of the 22 districts in the Presidency; and in the first three districts there has been more than 7,000 deaths, and in the rest between 5,000 and 6,000. Except in Ganjám, Gódávari and Nellore districts it was not possible to arrange for inoculation on a large scale, and in Kurnool, Anantapur and South Arcot inoculation was not attempted at all owing to the absence of reliable returns. These figures would indicate the imperative need of having more inoculators and Veterinary hospitals.

4. Taking into consideration the large number of cattle in each of the above-mentioned districts as well as the heavy recurring mortality at these centres, it can confidently be forecasted that there will be no lack of work either in the direction of inoculation or in the treatment of cases in the Veterinary hospitals. That the number of deaths reported is misleading may be gathered from the fact that although only about 90,000 head of cattle are said to have died in the Presidency, 2,645,675 hides were exported from Madras alone, while the number utilized in this country would make the figure still higher. This statement is made to show how unreliable all our figures of cattle mortality are.

5. Among horses there were 439 deaths, and these were not however due to any contagious diseases scheduled under the Act.

6. The work of inoculation has been reviewed more fully in the subsequent paragraphs.

III (*b*).—Veterinary Hospitals.

Table V.

There were at the end of the year six Veterinary hospitals including the one that was opened in the Bellary district by the Society for the Prevention of Cruelty to Animals in the middle of January 1906.

2. Statement No. V appended hereto gives full details regarding the number of in and out-patients treated in each of these hospitals.

3. A larger number of cases was treated than in the previous year, and the practice at the hospitals in Madura and Trichinopoly was most satisfactory. The owners of cattle for whose benefits the rural hospitals are chiefly intended and the wealthy people have equally availed themselves of the usefulness of these hospitals, and the number of cases treated is a guarantee of their growing popularity. Below will be found a list of the various operations performed in the Veterinary College hospital during the year.

Name of operation.	Number of cases.			Name of operation.	Number of cases.		
	Horses.	Cattle.	Dogs.		Horses.	Cattle.	Dogs.
Major—				*Major*—cont.			
Suturing wounds	53	3	23	Difficult parturition	..	..	13
Amputation of tail	3	3	15	Neurotomy	2	..	..
Do. of penis	2	..	2				
Do. of horns	..	6	..	Total	144	68	188
Trephining	3	..	..	*Minor*—			
Castration	5	..	2	Opening of abcesses	6	15	28
Tracheotomy	2	..	..	Paring corns	14	..	..
Paracentesis thoracis	..	..	1	Do. seedy toes	5	..	..
Do. abdominis	..	..	5	Do. thrush	10	..	..
Setoning	13	5	..	Do bruised soles	5	..	..
Excision of tumours	48	47	13	Application of sand crack clams	4	..	..
Removal of cancerous growths	..	..	97	Scarifying	2	..	2
Removal of worm in the eye	4	..	..	Administering enemas	10	..	19
Setting of fractures	2	3	17	Nail-cutting	..	..	7
Do. of dislocations	2	..	..				
Aesophagatomy	3	..	..	Total	56	15	56
Rumentomy	..	1	..				
Phlebotomy	2	..	..	Grand Total	200	83	244

4. In Pithápuram the number of bovine patients increased by 195. It is important that this hospital should be maintained as more progress will be shown in future years.

5. In Saidapet there had been a slight increase in the total number of cases treated, and this was chiefly among cattle patients. This is significant of the fact that the hospital enjoys the confidence of cattle owners. The number does not include cases of infectious disease.

6. In the College hospital at Madras it is very gratifying to remark that the number of cases treated during the year under report exceeded those of last year by 232 cases. There was a very marked increase in the cattle patients which were mostly the property of private individuals. The Madras Corporation had also forwarded their cattle for treatment, and it is hoped that each succeeding year will show a steady increase in the number of cattle patients, as it is the most important branch with which our Veterinary Graduates will have to be concerned. There were 16 deaths among cattle treated in this hospital during the year under report. But I may mention that very frequently animals are brought to this hospital only as a last resource, and when it is almost hopeless to do anything for the poor beasts.

The students had the opportunity of seeing and taking care of many animals in the contagious wards which were suffering from foot and mouth disease. 1,138 cases of canine patients were treated, out of which there were 58 casualties. Many of the cases were of a most interesting and instructive nature, and the students were most attentive in pursuing this class of practice. In the equine practice 767 cases were treated with 16 casualties. As has already been remarked concerning bovine cases, the animals were always brought at a very late stage of the disease when recovery seemed almost hopeless. There were 400 major and 127 minor operations performed during the year as against 329 and 124 in the previous year.

7. It is not necessary to enter into details concerning the District Board Veterinary hospitals at Madura and Trichinopoly as the figures speak for themselves. For Madura the total number of fresh cases was 2,098 and the daily attendance was 68. For Trichinopoly the number of fresh cases was 1,081 and the number of animals treated daily worked out to about 50.

8. The cost of maintaining these institutions is about Rs. 600 including both medicines and contingencies but excluding establishment charges. Table VI.

9. These hospitals have undoubtedly supplied a long-felt want, and judging from the popularity of those already in use, I have no hesitation in stating that the veterinary dispensary will become popular wherever it is located. It is however submitted that these dispensaries should at first be supported entirely by Government and free treatment given to all animal patients brought for treatment. These are new institutions which have been offered to a very conservative people, and it will be some time before it may be expected to gain the confidence of the ryot, but when once their fear has been allayed they will readily take advantage of the aid. It will however be the poor animals which will most benefit as they will receive humane treatment.

Proposals for the working of all the dispensaries under one head and upon uniform lines will be submitted later.

10. The total collections for treatment in the Madras Veterinary College hospital were Rs. 7,091-13-1 against Rs. 6,364-12-1 during last year. Table VI.

IV (*a*).—Pony-breeding Operations.

At the commencement of the year there were 14 stallions at work, viz., 9 in the district of Coimbatore, 4 in Salem, and 1 in Madura. The stallions "Abdulla" and "Nile" were disposed of locally on account of their age for Rs. 106 and Rs. 105, respectively. Another stallion "Baby" was destroyed. In December, 4 new stallions were purchased at a cost of Rs. 2,000, and at the end of the year the complement number of stallions, 15, were at work. In Coimbatore the stallions were spread over the district, and 3 were placed at Kangayam which is the chief breeding centre in the district. One was at Pollachi throughout the year. "Rahiman" after his return from Ootacamund was stationed permanently in the Kollegal taluk. Two of the new stallions were sent to Aravakurichi and Palladam where they commenced work in February 1905. One pony worked until August in Kangayam and afterwards was sent to Dhárápuram. "Jumna" was stationed at Erode and Perundurai and "Ali" stood at Udamalpet for the greater portion of the year. In the Salem district operations were confined to the northern half of the district, viz., Hosúr, Krishnagiri, Pennagaram and Tiruppattúr taluks. At Hosúr there were two, and at Krishnagiri one stallion throughout the year under the charge of the Sub-Collector. The one in charge of the Head Assistant Collector worked for eight months in Harur and afterwards transferred to Tiruppattúr. A stallion was stationed in the Madura district in Palni and Vedasandur. The total number of coverings for all the 15 stallions was 310, viz., Coimbatore 179, Salem 101, and Madura 30, which does not however include the 18 coverings of "Abdulla", "Nile," and "Baby" which were disposed of. The first two did not cover any mares for eight months since August, and the third for five months since November. "Rahiman" was without work at Ootacamund for three months and the new stallions commenced work only in February, and one of them has not done any work yet. Calculating upon this it will be observed that only 11 out of 15 stallions had been at work during the year without intermission, and the average coverings per stallion was therefore 28 as against 27 in the previous year. The average was the same during 1903-1904 and this would show, I think, that the pony-breeding operations will become popular particularly as the people recognise that it is purely optional whether they bring their mares to be covered or not. Considering that the year was an extremely dry one the progress in this line is a matter for congratulation. Next year it is hoped that a fair will be held where ponies may be exhibited and prizes awarded. The results of coverings are annually improving, and when this is recognised I firmly believe that greater use will be made of the Government stallions. Table XI.

2. In the Salem district there were 101 coverings for four stallions. The work of "Carbon" in charge of the Head Assistant Collector was very poor, and it covered only 8 mares. "Tigris" maintained its good work and the apparent reduction in the number of mares covered during the year is no doubt due to the fact that he was not very well during the months of August and

October. "Sunshine" covered 33 mares, the highest number on record in Salem, and it was observed that although he was a slow coverer his services were very effective. The average coverings in Salem was 25 per stallion which though less by three than in the previous year is accounted for by the fact that one of the stallions had contributed only a very poor share. The work in Madura showed, however, an improvement, and the number of coverings rose from 19 to 30. Madura would require a small sized animal and it is intended to place a smaller sire here in future.

3. The proposal to station these stallions in a few other districts had to be kept in abeyance until the Veterinary Hospitals have been established in a few more centres. After the rains have set in, it is proposed to transfer a stallion to Bellary. It will be a tentative measure, and he will be attached to the Veterinary Hospital.

4. *Results of coverings.*—The total number of coverings in 1904–1905 was 356. The certificates referring to these cases were forwarded in time to the Tahsildars concerned for report. The results were reported in only 190 cases and of these 23 have been reported as untraceable. A list showing the names of taluks and the number of cases in each taluk on which report is due is submitted herewith. As far as the results have been ascertained 52 coverings were successful which gives a percentage of 31·1 on known cases. It has been reported that 115 cases proved empty or were unsuccessful. As there is no proper check, I cannot but form the opinion that these reports are filled in indiscriminately, and they therefore, I regret to say, cannot be taken as a correct standpoint for judging the progress of pony-breeding operations. That the introduction of good stallions has had a beneficial influence on the indigenous pony is abundantly clear to anyone visiting Coimbatore, and when it is remembered that most of the wonderful "Jutka" ponies are bred in the districts of Coimbatore and Salem it will be understood that this department is justified in continuing the work. When Veterinary dispensaries have been established, the castration of unsuitable ponies will be vigorously pushed.

Table IV. 5. *Castration.*—This work was carried on as usual only in the districts of Coimbatore and Salem. Two salustries were employed in the Coimbatore district in the taluks of Dhárápuram, Kangayam, Karur, Méttupálaiyam, Bhaváni and Kollegal. The total number of ponies castrated rose to 73 against 63 last year. One of the salustries was on leave during the latter part of March 1906. The salustry in Salem was, with the exception of one month, continuously employed at Hosur, and 31 ponies were castrated against 16 last year. These salustries have also been looking after the stallions, and they were not infrequently ordered to proceed to other stations when reports of ordinary illness among Government stallions are received. These men have thus been of considerable service, and it is necessary for the good results of pony breeding that castration of unsuitable entires should be continued. There were two casualties among the castrated animals at Coimbatore due to tetanus, and in one case a compensation of Rs. 20 was claimed and paid to the owner.

IV (*b*).—Cattle Fairs and Shows.

Table XIV. There were several cattle fairs in the Tinnevelly district but only to two of them, held in Kazhugumalai and Muthulapuram, respectively, was it possible to render departmental assistance. These two fairs are important from the fact that very large number of cattle are collected. It was reported that at each of these fairs over 15,000 cattle were present. In almost all the districts of this Presidency cattle fairs are held weekly, as well as annually. It is important that, as in Tinnevelly district, the Madras Cattle Disease Act II of 1866 should be enforced in all the big fairs in order to prevent sick cattle being brought in contact with the healthy ones. Naturally these cattle fairs afford a fertile source for the spread of cattle disease and therefore they should be carefully looked after. During the year Cattle Shows were held in Anakápalle, Vizagapatam district; Ongole, Guntúr district; and Pithápuram, Gódávari district. Full reports of these important Shows have already been submitted. Altogether about 1,634 cattle were exhibited at these Shows and Rs. 4,212 besides other valuable presents were distributed in awards. The Shows were a decided improvement on those held in the previous year at Ongole and Vizianagram, and it is confidently anticipated that annually these Shows will become of greater importance. The great feature of these Shows was the number of excellent bulls and heifers ranging from two to five years old. There is a great deal to be done in improving the stock of buffaloes. These should eventually prove of very great commercial value. Some attention was paid at these Shows to the exhibition of sheep and goats as well as poultry. It is hoped that under the auspices of the district Associations these Shows will be held annually.

Besides the Shows above mentioned there was one held at Bellary, and one at Kottacheruvu in the Anantapur district, both held in connection with the Agricultural exhibitions. Although the class of exhibits were inferior, both in number and quality, they should be encouraged as they are likely to afford great object lessons.

Table VIII. 2. Seven young bulls of the Nellore breed were purchased at the last Ongole Show and distributed to villages in the Guntúr district for breeding purposes. Owing to the unfavourable season of the year, it was not found advisable to purchase Kangayam and Alambadi breeds. The Ongole bulls have been entrusted to selected breeders and the results will be anxiously watched.

V.—Veterinary Assistants.

The chief duty of Veterinary Assistants consisted in attending outbreaks of cattle disease and carrying out inoculation of cattle in the herds affected with disease. In each of the districts of Ganjám, Gódávari, Bellary and Tanjore, a Veterinary Assistant has been on duty throughout the year. Tinnevelly, Madura, Chingleput, Nellore, Guntúr and Kistna are the other districts in the Presidency which received Veterinary aid in the treatment of cattle as occasion required. When Veterinary graduates are available it will be necessary to station one assistant permanently in each of the above districts for inoculation work. They afford a vast field for such work owing to the enormous number of indigenous cattle, and the large collection of cattle at certain times of the year for grazing purposes, fairs, etc., which renders the spread of epidemics more easy. It is to be regretted that owing to the small staff it was found impossible to render aid in all cases, therefore only the more urgent reports were attended to. For example in the Ganjám district where one Veterinary Assistant has been permanently stationed, reports were received regularly from 149 villages, and of these it was possible to attend only to 61 villages. These 149 villages were spread over eight taluks, and 7,483 cattle were inoculated. In the Gódávari district only 2,996 cattle were inoculated. Until very recently the method of forwarding outbreak returns had been very defective, otherwise more useful work would have been done there. From Tanjore reports were received very regularly from Tirutturaippúndi, Negapatam, Máyavaram and Pattukkóttai taluks and as a result it was possible to take immediate measures and 14,229 cattle were protected. It forms nearly one half of the total number of inoculated cattle. In Bellary district the Collector has taken considerable interest in proclaiming to the people this new form of treatment, and the benefits attained in the other parts of the Presidency. It would appear that he called upon the Tahsildars to personally instruct the village officials about this treatment, and to request them to hold meetings in the villages for the purpose of submitting their cattle for protective inoculation in times of epidemic cattle disease, and for intimating the Revenue authorities immediately on the occurrence of an outbreak. He has further caused a notice to appear in the District Gazette about inoculation and the movements of the Veterinary Assistant. The Sanitary, the Plague and the Police Inspectors were asked to report to the Veterinary Assistant any cases of outbreak among cattle in the villages they visit. These orders have facilitated the work of the Veterinary Assistant and kept his whole time properly occupied. The Veterinary Assistant has been recognised throughout the district as an employé of the Revenue department and there was less obstruction in the performance of his duties than at the commencement of his work. 1,290 cattle were inoculated here. I take this opportunity to state that if similar procedure is adopted in other districts, the work of the Veterinary Assistant will be more fully appreciated. From Sivaganga I was informed that a petition had been received from the headmen of several villages asking that a Veterinary Assistant might be sent to inoculate their cattle as disease had broken out and those animals which had not been protected were dying in large numbers, while those which had been inoculated were immune. This I consider to be extremely gratifying, and will no doubt help to make our work popular. Table VII.

2. Contagious disease is prevalent in some form or other throughout the year, and in order to render efficient help, it is absolutely necessary that returns of outbreaks should be forthcoming from each district regularly. One Veterinary Assistant visited Nellore, Guntúr and Kistna districts, and inoculated in all 6,424 cattle for both rinderpest and anthrax. Chingleput and Madura districts received a passing attention, and 603 cattle were protected against anthrax. In four villages of Sáttúr taluk in the Tinnevelly district sheep were affected with anthrax in an unusual degree. 2,521 sheep and 128 cattle were inoculated with anthrax serum with eminently satisfactory results. The total number inoculated during the year was 33,153 cattle, and 2,521 sheep in 31 taluks, comprised in the districts already mentioned. The following table will show the steady progress attained in this work :— Table III.

—	Malignant sore-throat.	Anthrax.	Rinderpest.	Total.
1902-1903	..	377		377
1903-1904	..	6,329	2,805	9,134
1904-1905	..	12,437	8,251	20,688
1905-1906	833	22,152	12,689	35,674

There was not only an increase in the total figures, but also under each disease. During the year serum was obtained for malignant sore-throat and 833 cattle were protected against that disease.

3. As the work of inoculation is being appreciated now in all the districts where it has been introduced, I would emphasise the importance of requiring the revenue officials to forward summary returns of outbreaks of disease every week to the office of the Superintendent, Civil Veterinary Department, when they occur in any village.

4. The services of Veterinary Assistants M. Hasan Ali Sahib and Narasinga Rao were lent to the District Boards of Madura and Trichinopoly, respectively, when in the former station the place was vacant and in the latter Mr. Richards, the permanent incumbent, was on privilege leave for two months. M. Hasan Ali Sahib has been deputed during the year to investigate certain reports of deaths among inoculated cattle in Berhampur and Tuni, and it was found out that either the deaths were wrongly reported or that they were due to other diseases against which the cattle had not been immunized. The deaths among inoculated cattle were only 134 according to reports received in this office. This gives a percentage of ·37 deaths among the animals inoculated, and must be considered to be entirely satisfactory; otherwise the ryots would not have accepted the inoculation for a second time. In places where its benefits were known, the assistance of a Veterinary Assistant has been asked for. Opportunity was taken at some of the cattle fairs, which Senior Veterinary Assistant Subrahmania Mudaliar attended, to demonstrate to large crowds the harmlessness of the treatment

5. The four new Veterinary Assistants were chiefly employed on inoculation work, but they have also treated cases, both medical and surgical, among horses and cattle during their tours. It has been reported that their help has been frequently applied for, but they could not treat more cases for want of the requisite medicines.

The two Senior Veterinary Assistants V. P. Subrahmania Mudaliar and M. Hasan Ali Sahib have been employed on other work as well, such as attendance at cattle fairs and shows, and treatment of Government stallions, in cases of sudden illness. The latter has done good service in assisting the local committees in the organization of the cattle-shows that were held during the year. He was also employed temporarily in the Veterinary College in teaching Botany and Chemistry.

6. The services of Senior Veterinary Assistant, V. P. Subrahmania Mudaliar, were lent to the Deputy Director of Agriculture for the purpose of purchasing bullocks for the Coimbatore farm, and on this duty he was occupied for a month and eleven days. He was employed for some time in translating into Tamil the book on "The more deadly forms of cattle disease in India".

7. Four of the Veterinary Assistants were on privilege leave during the year, three of them for a month each, and the other for a month and twenty-five days.

8. The following doses of serum were received from the Imperial Bacteriologist during the year:—

	Doses.
Rinderpest	14,000
Anthrax	21,000
Hæmorrhagic septicæmia	14,000

VI.—Expenditure of the Department.

Tables XII and XIV (*a*).

The report on the expenditure of this department during the year, with statements XII and XIV (*a*), will be furnished separately on receipt of final returns from the Accountant-General.

VII.—Conclusion.

In conclusion, I have the honour to bring to notice the valuable help I have had from Mr George D'Silva, who held charge of the Veterinary College during my absence on tour. He maintained the excellent discipline of the College and attended to the Hospital practice throughout the year. He was ably helped by the two lecturers Mr. Valladares and Mr. Sampathu Iyengar. The Head Clerk Mr. Srinivasulu Naidu conducted the heavy and steadily increasing work of my office to my entire satisfaction. In addition to his other duties he has been made Manager of the Students' Hostel which, to make it work amicably and economically, requires close attention which he devotes out of office hours.

Madras,
7th May 1906.

(Signed) W. D. Gunn,
Supt., Civil Veterinary Dept.

APPENDICES.

TABLE I showing the main results of Veterinary colleges and schools during the year 1905–1906.

Veterinary colleges and schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the year.		Passed final examination during the year.	Failed to pass final examination.	Remaining under instruction at end of year.				
		Scholarship-holders.	Paying students.			In ordinary course.	Instruction prolonged by reason of failure to pass.	Matriculated with higher qualifications.	Knowing some English but not matriculated.	Knowing no English or very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary college, Madras.	..	11	Tuition is given free.	..	..	75	..	27	3 (2 Eurasians, 1 Muhammadan (exempted)).	..

Veterinary colleges and schools.	Receipts.			Expenditure.			Employment of students passed out during the three years preceding.				
	From fees.	From other sources.	Total.	Salaries of Instructing staff.	Other expenses.	Total.	Total number passed.	In service of Government or Local Board.	In services of other bodies or Institution.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
Veterinary college, Madras.	..	Rs. A. P. 58 0 0 (sports fees).	Rs. A. P. 58 0 0	Rs. A. P. 5,212 13 11	Rs. A. P. 2,564 3 3 (scholarships for students).	Rs. A. P. 7,777 1 2	..	..	..	..	..

TABLE II showing number of deaths (contagious diseases) amongst animals during the year 1905–1906.

Province.	Equines.					Bovines.						
	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest, diarrhœa and dysentery.	Anthrax.	Malignant sorethroat.	Black quarter.	Epizootic aphtha.	Other diseases.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13
Madras Presidency ..	16	..	..	286	302	19,050	13,474	8,838	5,952	4,074	38,905	90,293

TABLE III.—Statement showing result of preventive inoculation during the year 1905–1906.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Rinderpest.		
				Equines.	Bovines.	Others.
1	2	3	4	5	6	7
Tanjore	..	..	58	..	2,943	..
Tinnevelly	..	..	10	..	..	..
Madura		..	1	..	..	..
Bellary	..	..	23	..	72	..
Gódávari	..	..	35	..	2,893	..
Ganjám	..	..	43	..	5,312	..
Chingleput	..	..	7	..	..	..
Nellore	..	..	23	..	..	..
Guntúr	..	..	39	..	..	..
Kistna	..	..	21	..	1,469	..
,, Total ..	..	..	260	..	12,689	..

Districts.	Anthrax.			Hæmorrhagic septicæmia.		
	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
	8	9	10	11	12	13
Tanjore	..	10,453	..	..	833	..
Tinnevelly	..	128	2,521	..	..	..
Madura	..	271	..	..	..	..
Bellary	..	1,218	..	..	..	..
Gódávari	..	103	..	..	..	..
Ganjám	..	2,171	..	..	..	..
Chingleput	..	332	..	..	..	..
Nellore	..	3,212	..	..	..	..
Guntúr	..	1,743	..	..	..	..
Kistna	..	..	..	..	..	..
Total ..	..	19,631	2,521	..	833	..

TABLE IV showing the number of animals treated and castrated by Veterinary Assistants on tour during 1905–1906.

Province.	Number of villages visited.	Number of Veterinary Assistants employed.	Castrations performed.				Treated for contagious diseases.	
			Equines.	Bovines.	Others.	Total.	Equines.	Bovines.
1	2	3	4	5	6	7	8	9
Madras Presidency ..	..	6	4	5	25	34	..	..

Province.	Treated for contagious diseases—*cont.*		Treated for non-contagious diseases.				Total number of cases treated and castration performed.	Remarks.
	Others.	Total.	Equines.	Bovines.	Others.	Total.		
	10	11	12	13	14	15	16	17
Madras Presidency ..	..	..	..	..	..	..	..	Veterinary Assistants on tour had no opportunities for treating patients except by inoculation.

TABLE V showing number of animals treated at Veterinary hospitals and dispensaries during the year 1905–1906.

Province.	Number of Veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients.											
			Remaining on 1st April.			Admitted during the year.			Total.			Discharged during the year.		
			Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pithápuram	1	1	..	..	..	8	6	2	8	6	2	7	6	2
Bellary	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Madura	1	1	2	..	..	32	12	3	34	12	3	33	12	3
Trichinopoly	1	1	15	19	4	..	..	..	15	19	4	..	..	..
Saidapet	1	1	12	2	3	68	108	46	80	110	49	73	108	47
Madras	1	4	32	22	14	457	243	411	489	265	425	470	251	409

Province.	In-patients—*cont.*			Out-patients.						Total number of in and outpatients treated during the year.				Receipts.	Expenditure.
	Balance on 31st March.			Number treated during the year.			Average daily attendance.								
	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Equines.	Bovines.	Other animals.	Total.		
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pithápuram ..	1	..	..	44	622	134	1	2	1	52	628	136	816	Rs. ..	Rs. 1,311-1-2.
Bellary	..	..	..	757	1,970	686	10	26	9	86	175	90	351	2,090	Rs. 2,090. The hospital was opened on the 15th January 1906.
Madura	1	..	..	13,031	9,741	1,997	36	27	5	998	946	154	2,098	..	Rs. 2,082.
Trichinopoly ..	..	..	..	5,368	11,611	2,395	14	30	6	302	607	172	1,081	832	Rs. 2,381.
Saidapet ..	7	2	2	1,706	3,264	1,579	5	9	3	338	549	348	1,235	3,200	Rs. 1,518-1-7.
Madras ..	19	14	16	2,191	734	3,646	6	2	10	767	296	1,150	2,213	7,091	Rs. 7,975-8-5.

TABLE VI.—Abstract showing receipts and expenditure of Veterinary dispensaries during 1905–1906.

Province.	Receipts.						
	Last year's balance.	By Local Fund grants.	By Government grants.	By Municipal contribution.	By Fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
		RS. A. P.	RS. A. P.		RS. A. P.	RS. A. P.	RS. A. P.
Pithápuram	Under Court of Wards there is no special provision.						
Bellary	..	740 4 4	787 9 0	..	2 0 0	560 4 5	2,090 1 9
Madura	No special provision has been made.						
Trichinopoly	No special provision has been made.				582 12 0	249 8 6	832 4 6
Saidapet	..	..	2,362 0 0	..	746 3 10	91 11 3	3,199 15 1
Madras	..	..	9,964 0 0	..	7,091 13 1	..	17,055 13 1

Province.	Expenditure.						
	Pay.	Travelling allowance.	Medicines, instruments, etc.	Furniture, etc.	Contingencies.	Total.	Balance.
	9	10	11	12	13	14	15
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Pithápuram	1,171 0 0	1 6 6	125 10 9	12 15 11	..	1,311 1 2	..
Bellary	339 4 6	104 4 0	607 9 0	* 857 0 3	182 0 0	2,090 1 9	..
Madura	1,187 13 2	71 9 0	301 14 11	311 10 7	208 13 8	2,081 13 4	..
Trichinopoly	1,456 0 0	13 6 0	662 2 9	..	249 9 8	2,381 2 5	..
Saidapet	859 8 0	..	373 9 7	..	285 0 0	1,518 1 7	..
Madras	..	..	1,189 7 6	..	6,786 0 11	7,975 8 5	9,080 4 8

* Includes cost of building Rs. 714-6-3.

TABLE VII showing total strength of subordinate Veterinary staff employed during 1905–1906.

Province.	How occupied.	Whether paid from Provincial or Local Funds.	Veterinary Inspectors.	Veterinary Assistants.	Remarks.
1	2	3	4	5	6
				NO.	
Madras	Inoculation and inspection of cattle fairs and shows.	Provincial	..	6	
	In charge of hospital	Local Fund	..	2	
		Court of Wards ..	..	1	
		Society for the Prevention of Cruelty to Animals, Bellary.	..	1	
	College work ..	Provincial	..	1	
		Total ..	..	11	

TABLE VIII.—Return of stud bulls for the year 1905–1906.

Province.	Property of Government.				
	Number on 1st April.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1906.
		Number.	Average price paid.		
1	2	3	4	5	6
			Rs.		
Madras	..	7	75	1	6

Province.	Property of local bodies.				
	Number on 1st April.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March.
		Number.	Average price paid.		
	7	8	9	10	11
Madras	..	..	..	..	..

TABLE IX showing main results of the working of Provincial cattle farms during the year.—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions under local bodies for the year 1905–1906.—*Nil.*

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions during the year 1905–1906.

Horse, pony or donkey.	Province.	Stallions on register on 31st March 1905.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
The stallions at stud are under the Provincial Department of Government.									
Pony	Madras	14	15	14	328	356	* 28	† 27	* Three stallions were since disposed of and they covered only eighteen mares. Four new stallions commenced work only in February and there had been only ten coverings. The average is calculated for eleven stallions on 310 coverings. † *Vide* last annual report.

TABLE XII showing average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1905–1906.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	RS. A. P. ..	RS. A. P. ..	RS. A. P. 23 14 7	RS. A. P. 23 5 0	RS. A. P. ..	RS. A. P. ..	The total expenditure for upkeep alone of Government stallions amounted to Rupees 4,303-12-8 and this has been distributed for fifteen stallions—*vide* paragraph 1 of section IV (*a*) of the annual report.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year—*Nil.*

TABLE XIV.—Abstract of particulars regarding cattle fairs and shows held during the year 1905–1906.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animal sold.				
		Bulls.	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Tinnevelly cattle fairs ..	2	5	38,000	80	150	250	..	..	50	75	35	30	..
Cattle shows.													
Anákapalle (Vizagapatam district).	3	74	200	15	40	67	..	29	..	..	..	..	..
Ongole (Guntúr district).		409	260	224	..	65	..	169	100	200	100	..	..
Pithápuram (Gódávari district).		20	130	78	9	43	..	76	..	..	..	..	..
Bellary *		9	23	7	2	26	..	7	..	..	..	..	..
Total ..	..	512	613	324	51	201	..	281	100	200	100	..	..

Province.	Amount realized in fees.	Total number of animals that competed for prizes.	Prizes awarded						Number of medals awarded.	Remarks.
			From Imperial funds.	From Provincial funds.	From Local bodies.	From other sources.	Total.	Amount actually awarded.		
	15	16	17	18	19	20	21	22	23	24
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.		
Tinnevelly cattle fairs ..	..	..	..		..	..	..	..	..	
Cattle shows.										
Anakápalle (Vizagapatam district).	..	425	500	..	300	..	800	876	4	2. Government of India.
Ongole (Guntúr district).	..	1,127	500	300	300	..	1,100	2,587	4	2. Do. do.
Pithápuram (Gódávari district).	..	356	..	..	250	750	1,000	749	3	2. Do. do.
Bellary	..	74	..	250	..	..	250	281	..	
Total ..	..	1,982	1,000	550	850	750	3,150	4,493	11	

* *Note.*—A cattle show was held at this station in conjunction with an agricultural show.

TABLE XIV-A.—Statement showing cost of the Civil Veterinary Department during the official year 1905–1906 in the province of Madras.

Major heads.	Amount.				Remarks.
	Imperial.	Provincial.	Local.	Total.	
1	2	3	4	5	6
	RS. A. P.	RS. A. P.		RS. A. P.	
1 Salaries of officers	17,775 0 0	..	..	17,775 0 0	
2. Do. of subordinates	..	9,233 11 11	..	9,233 11 11	
3. Travelling allowance of officers ..	..	2,391 3 6	..	2,391 3 6	
4. Do. subordinates.	..	3,023 7 6	..	3,023 7 6	
5. Other allowances	..	600 0 0	..	600 0 0	
6. Supplies and Services	..	8,451 14 1	..	8,451 14 1	
7. Contingencies	..	1,088 8 9	..	1,088 8 9	
8. Prevention of diseases	..	..	..	..	
9. Schools and Colleges	..	21,005 6 9	..	21,005 6 9	
10. Prizes at fairs and shows	1,000 0 0	500 0 0	..	1,500 0 0	
Total ..	18,775 0 0	46,294 4 6	..	65,069 4 6	

TABLE XV.—Comparative statement of cattle mortality for five years ending 1905–1906.

Causes of death.	Number of deaths among Cattle for the official year.				
	1901–1902.	1902–1903.	1903–1904.	1904–1905.	1905–1906.
Diseases.					
Rinderpest, Diarrhœa and Dysentery ..	18,644	16,555	17,655	19,772	19,050
Anthrax	18,215	13,496	16,887	14,996	13,474
Malignant sore throat	7,662	9,063	13,769	11,317	8,838
Black quarter	2,421	2,989	7,616	7,683	5,952
Epizootic aphtha	4,722	11,456	4,683	2,767	4,074
Others	37,333	35,417	32,548	33,336	38,905
Total ..	88,997	88,976	93,158	89,871	90,293
Other Causes.					
Snake bite	1,761	2,109	2,278	2,257	2,011
Wild animals	10,811	10,937	10,886	12,061	13,232
Criminal poisoning	34	71	71	52	58
Total ..	12,606	13,117	13,235	14,370	15,301
Grand Total ..	101,603	102,093	106,393	104,241	105,594

TABLE XVI.—Statistics of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during the official year 1905–1906.

Districts.	Number of deaths among — Cattle. From diseases. Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám ..	3,643	781	702	214	285	1,266	6,891	66	282	1
2. Vizagapatam ..	640	518	272	102	230	391	2,153	37	60	4
3. Gódávari ..	2,287	1,551	223	196	268	2,739	7,264	74	126	3
4. Kistna ..	2,012	1,651	693	195	240	3,044	7,835	224	52	12
5. Guntúr ..	872	718	924	367	84	1,097	4,062	68	65	4
6. Kurnool ..	1,192	749	333	852	192	4,184	7,502	113	431	2
7. Bellary ..	498	355	415	790	130	3,036	5,224	25	223	6
8. Anantapur ..	409	800	301	1,003	78	3,835	6,426	35	261	..
9. Cuddapah ..	884	487	214	721	129	1,858	4,293	62	604	2
10. Nellore ..	523	370	496	275	232	4,650	6,546	149	151	7
11. Chingleput ..	623	995	564	31	75	696	2,984	109	8	2
12. South Arcot ..	407	666	311	63	517	3,523	5,487	187	298	1
13. North Arcot ..	445	479	623	106	369	796	2,818	181	612	..
14. Salem	268	204	156	153	111	777	1,669	47	309	.
15. Coimbatore ..	466	171	322	324	95	1,613	2,991	102	777	8
16. Trichinopoly ..	484	423	173	22	148	2,278	3,528	51	45	4
17. Tanjore ..	910	1,136	1,136	82	124	436	3,824	98	..	1
18. Madura ..	1,534	936	356	338	609	1,548	5,312	165	210	1
19. Tinnevelly ..	329	307	44	9	23	564	1,276	101	39	..
20. Nilgiris ..	..	1	94	18	2	23	138	5	361	..
21. Malabar ..	555	172	349	19	114	171	1,380	102	2,715	..
22. South Canara	69	4	137	72	28	380	690	10	5,603	..
Total ..	19,050	13,474	8,838	5,952	4,074	38,905	90,293	2,011	13,232	58

Districts.	Number of deaths among—*cont.* Cattle—*cont.* Total.	Grand Total.	Total stock by the latest census.	Horses and ponies. From diseases. Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand Total.	Total stock by the latest census.
13	14	15	16	17	18	19	20	21	22	23	24	25
1. Ganjám ..	349	7,240	305,856	..	..	..	..	..	..	..	..	..	..
2. Vizagapatam ..	101	2,254	128,721	..	..	..	..	..	..	..	..	..	..
3. Gódávari ..	203	7,467	534,543	2	5	21	28	1	1	..	2	30	1,486
4. Kistna ..	288	8,123	786,471	..	5	33	38	2	3	..	5	43	1,913
5. Guntúr ..	137	4,199	..	..	..	5	5	3	9	..	12	17	..
6. Kurnool ..	546	8,048	197,082	2	1	24	27	..	8	..	8	35	32
7. Bellary ..	254	5,478	502,360	6	1	49	56	1	11	1	13	69	3,735
8. Anantapur ..	296	6,722	1,548,723	4	..	50	54	1	11	..	12	66	2,369
9. Cuddapah ..	668	4,961	942,078	..	..	17	17	1	4	..	5	22	1,651
10. Nellore ..	307	6,853	..	..	..	6	6	2	1	..	3	9	..
11. Chingleput ..	119	3,103	662,698	..	..	1	1	..	.	..	..	1	952
12. South Arcot ..	486	5,973	1,166,329	8	..	2	10	..	2	..	2	12	2,685
13. North Arcot ..	793	3,611	896,082	..	..	4	4	2	6	..	8	12	1,480
14. Salem ..	356	2,025	1,069,586	1	1	2	4	2	9	..	11	15	3,611
15. Coimbatore ..	887	3,878	1,151,637	1	2	14	17	2	16	..	18	35	3,070
16. Trichinopoly ..	100	3,628	609,139	..	..	3	3	..	.	..	..	3	905
17. Tanjore ..	99	3,923	936,740	3	..	2	5	..	..	..	..	5	1,363
18. Madura ..	376	5,688	1,143,644	4	1	15	20	2	19	..	21	41	3,633
19. Tinnevelly ..	140	1,416	482,925	..	..	2	2	1	2	..	3	5	870
20. The Nilgiris ..	366	504	64,850	..	..	..	..	..	11	..	11	11	1,820
21. Malabar ..	2,817	4,197	966,058	2	..	3	5	..	3	..	3	8	1,087
22. South Canara.	5,613	6,303	660,182	..	..	..	..	..	.	.	..	..	235
Total ..	15,301	105,594	14,755,704	33	16	253	302	20	116	1	137	439	32,897

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., L.R. and Agri.), Mis. No. 4542, dated 27th July 1906.

ABSTRACT.—Submitting report on the operations of the Agricultural Department during the year 1905–1906.

Order—No. 886, Revenue, dated 11th September 1906.

Miscellaneous.

Recorded.

2. The year under report was marked by a steady expansion of the operations of the Department; but many of the department's chief undertakings are still in a very early stage, while in respect to staff, the period was one of transition so that few definite results were to be expected. The crying need of the department is still additional men. The recruitment of experts in Europe is under the consideration of the Secretary of State, and there is good reason to hope that some progress in this direction will be made during the current year. The establishment of a new College of Agriculture at Coimbatore was determined on during the year under report and the necessary site for the College and Farm was acquired. Building operations have since commenced, and when this College is erected, and the staff necessary to man it has been entertained, the Agricultural Department will be in a position to train a satisfactory supply of Agricultural Inspectors and to meet the demands for skilled guidance and advice that are now received.

3. Some useful work in regard to sugarcane was done during the year at the Samalkóta Agricultural station, and the canes there raised are reported "to have taken a firm hold on the district." But the hope of finding a cane, which shall be immune from disease, does not seem likely to be realized, as it is stated that each variety is likely in turn to become subject to attack, and no remedy or preventive has yet been discovered. The season was unfavourable for the experiments conducted at Bellary and Koilpatti stations, nor can any conclusive results in such matters as deep tillage and manures be expected except from a prolonged series of experiments. The investigation of the pepper plant at the Taliparamba station was in too early a stage to yield results. The attempt to supply the ryot with selected cotton-seed met with an encouraging degree of success, and will be repeated during the present year, along with other measures for the improvement of this important crop. The conditions of the year were not favourable to the experiments connected with tobacco. Pumping experiments conducted under the control of Mr. Chatterton have demonstrated the utility of oil-engines as a source of motive power for raising water for irrigation, and in seven cases, loans have been taken by private individuals with a view to establishing pumping machinery. This result is encouraging. The Veterinary College has not yet turned out its first batch of trained students, and little fresh work could therefore be done in the expansion of Veterinary operations. A number of cattle shows and agricultural exhibitions were held and appear to have attracted much public interest.

4. The report draws attention to the need for the early appointment of a separate Director of Agriculture and the Government realize that the work connected with the Department is constantly increasing. They have therefore decided to appoint a Director of Agriculture under the Board of Revenue which will relieve the present Director of much administrative work.

5. The annual report has necessarily been considerably increased in bulk by the recent orders requiring a brief account of the administration of the several agricultural stations to be appended to the Director's report, but the Government consider that there is room for greater compression. The first three appendices should be combined into one and the contents arranged strictly under the headings of the several agricultural stations, the officer in charge of each appending his name to the summary of the work done.

(True Extract.)

A. G. CARDEW,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement, Land Records and Agriculture).
„ the Public Department.
„ the Educational Department.
„ the Inspector-General of Agriculture.
„ the Inspector-General, Civil Veterinary Department.
„ the Minister of Agriculture, Argentine Republic.
„ the Entomologist to the Government of India.
„ Monsieur Chailley-Bert.

Copy to the Government of India, Department of Revenue and Agriculture (with C.L.);
Editors' Table.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1906-1907.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.
1907.

Maximum number of pages prescribed—

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Administrative report of the Superintendent of Pumping Experiments	
Government Botanist's Report	4
Report on the College of Agriculture, Saidapet.. ..	
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I

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1906-1907.

I.—PREFATORY.

The year under report will be a memorable one in the history of the department, as it witnessed the long-contemplated additions to the expert staff, the laying of the foundation stone of the Coimbatore College by His Excellency the Governor, and the further development of the work of the department. There are now ten Agricultural Stations, including the Hindupur plantation and the Central Farm at Coimbatore. The Imperial grant was raised from Rs. 1½ to 3 lakhs. The Hon'ble Mr. A. E. Castlestuart Stuart held the post of Director of Agriculture until October when the post of a separate Director was created and Mr. M. E. Couchman, I.C.S., appointed to it and joined his post on October 24th, 1906. The designation, Commissioner of Revenue Settlement and Director of the Department of Land Records and Agriculture was changed to Commissioner of Revenue Settlement, Survey, Land Records and Agriculture. Mr. C. Benson, Deputy Director of Agriculture, retired from the service of Government on June 15th, after a service of about 32 years, and Mr. R. W. B. C. Wood took over charge from him with the title of Superintendent of Farms, since changed to that of Deputy Director. Mr. C. J. W. Shepperson, Principal of the Agricultural College, arrived on 1st December 1906 and at once took charge of the Central Farm at Coimbatore from Mr. Wood. Mr. W. H. Harrison, Agricultural Chemist, arrived on 20th November 1906 and proceeded to Pusa where he remained till after the end of the year. Mr. C. A. Barber went on furlough on medical certificate on 19th January 1907. Since the end of the year Mr. H. C. Sampson, Agricultural Expert to the Court of Wards, was appointed as the Second Deputy Director. Mr. Chatterton held the post of Superintendent of Pumping Experiments during the year.

2. The Commissioner of Agriculture spent 113 days on tour and visited all the Agricultural Stations including the Central Farm at Coimbatore. He attended the Agricultural Shows at Madura, Bobbili, Pithápuram and Ongole and the Agricultural and the Industrial Exhibition at Cannanore. He also attended the laying of the foundation stone of the Coimbatore College and Research Institute by His Excellency the Governor in September. The Director of Agriculture spent 99 days on tour during which time he visited all the Agricultural Stations. He attended the meeting of the Board of Agriculture at Cawnpur in February. From January 19th he was in charge of the Samalkota and Palur Agricultural Stations in addition to his own duties.

II.—SCIENTIFIC AND NATIONAL ENQUIRY.

3. *Entomology.*—Entomological Assistant Ramachandra Rao completed a course of six months' training at Pusa in August and returned to Madras. In June 1906 the Imperial Entomologist communicated a note suggesting the lines of work to be undertaken by the Entomological Assistants. This was at first to chiefly consist of learning the common pests of the province and ascertaining by enquiries from cultivators which are the most destructive; they were also to learn the remedies useful against the pests and demonstrate to the ryots such simple remedies as are within their capacity, such as pulling up and burning the stubble of a crop which has been attacked. The importance of the Assistants keeping in close touch with the Imperial Entomologist at Pusa was pointed out, and the submission of monthly reports through the Director suggested. The recommendations are being followed, and, in the absence of a Provincial Entomologist, who is much wanted, some expert control over the work of the Entomological Assistants is being exercised. Mr. Lefroy visited the Presidency in December and discussed the programme for next year's work with the Assistants. The department is much indebted to him for the valuable advice and help afforded on every occasion. In January it was reported that the paddy and irrigated dry crops of several villages in the Penukonda and Anantapur taluks were being attacked by some disease. The specimens sent, however, were pronounced by the Imperial Entomologist incapable of causing the damage described. Precautions against a repetition of the attack suggested by the Imperial Entomologist were communicated to the Collector.

Special attention was paid to the "surul" (or leaf-roller caterpillar) pest which usually shows itself on the ground-nut crop. One Entomological Assistant was studying the pest on the Hagari Farm, where the crop, introduced to the district for the first time, was almost destroyed by this pest; another Assistant was sent to Palur in South Arcot; special instructions were issued that a search should be made for the plants upon which the pest lives in the absence of the ground-nut crop. The Imperial Entomologist himself paid a visit to some villages in the vicinity of Villupuram to see the pest in the field. It is hoped that some useful information has been collected.

4. *Mycology.*—The Imperial Mycologist paid a visit to the Gódávari delta in August 1905 to study the fungus disease attacking the palmyra and cocoanut trees. His report was received in April 1906, and a small special staff of three Revenue Inspectors was sanctioned by Government in October to work experimentally in three firkas on the lines suggested by Dr. Butler. Tappers were employed to climb the trees and cut off the tops of diseased trees, and another set of tappers was employed to apply Bordeaux mixture to the leaf sheaths of the healthy trees in the vicinity. The Imperial Mycologist, accompanied by the Director of Agriculture inspected the work in March; and it was found that the disease was spreading slowly, and destroying more than half the palmyras in the affected areas. It was decided that the operations should be in future confined to the cutting off the heads of attacked trees; a much larger staff was to be employed; this was to be concentrated in the Amalápuram taluk where the disease was first observed, and where it is more severe and more widely spread than elsewhere, and placed under the control of an Assistant Collector. These proposals have subsequently been approved by Government and the staff has commenced work.

5. *Seed and other products supplied to and received from other Provinces.*—Some red gram, cholam and turmeric was furnished to the Bengal Agricultural Department for experimental cultivation; some seed of Hibiscus cannabinus and Sea Island cotton were supplied to the Assistant Superintendent of Land Records and Agriculture, Coorg; ground-nut to the Reporter on Economic Products; and perennial tree cotton seed of the kidney and naked seed varieties to the Inspector-General of Agriculture. A small quantity of seed of "Northerns," "Westerns," "Salems" and "Shem Prantti" was supplied to the Deputy Director of Agriculture, Bombay. Other requisitions complied with were as follows:—

Four ounces of tobacco seed to the Ceylon Agricultural Society, two ounces of *Eucalyptus globulus* for experimental cultivation at Lashio in the Northern Shan States; 1 lb. of *Hibiscus cannabinus* to the Reporter on Economic Products for the Consul for the Netherlands, 100 lb. each of *Vigna catiang*, *Dolichos uniflorus*, grey seeded,

and black-seeded for the Agrostologist, United States Department of Agriculture and a small quantity of different varieties of cow-peas and sorghums have been received in exchange; seeds of indigenous cottons from Ganjám, Tinnevelly, Coimbatore, Kurnool and Malabar for cultivation at Poona for botanical classification; samples of plantain fibre and yarn to the Director of Agricuture, Central Provinces for supply to Messrs. Fleisher & Co. United States, America. A quantity of dried leaf of Indigofera Sumatrana from Cuddapah was supplied to Mr. Bloxam at Leeds. An attempt made to grow lemon grass in a wardian case for transmission to the West Indies having failed, some seeds were sent instead. Samples of sugar made by local methods, and of the best varieties of canes grown at Samalkota were exhibited at the Cawnpur Conference.

Five bags of wild Abyssinian coffee seed procured from the British Legation, Adis Ababa, was distributed among the different coffee districts of Southern India. Reports received about it were unsatisfactory, the seed having apparently been picked immature.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

6. In G.O., No. 886, Revenue, dated 11th September 1906, the Government have observed that there is room for greater compression. The Administrative Reports of each Agricultural station are printed in the appendix. In addition to this, a separate scientific report for each station is being prepared giving full details of the experimental work in progress there. It would, therefore, seem sufficient if the main lines on which the work is being carried on with the different crops and on the different agricultural stations are briefly indicated here.

7. *Laying out and equipment of Agricultural Stations:—Central Farm and Agricultural College and Research Institute at Coimbatore.*—The farm itself is situated at a distance of about three miles from the Coimbatore Railway station, and consists of about 390 acres of dry land, comprising areas of both red, black cotton, and mixed soils, and 45 acres of wet land commanded by a channel-fed tank. The farm is being brought into good order and parts of it have been laid out for experimental purposes. In G.O., No. 2282 W. of 20th December 1906, an estimate for Rs. 4·47 lakhs was sanctioned for the construction of the main buildings. The foundation stone was laid by His Excellency the Governor on September 13th, 1906, and the main road through the farm christened the Lawley Road in honour of the occasion. The construction of residences for the officers of the Central Agricultural Research Institute, who, for the present, will be the Principal, the Government Botanist, and the Agricultural Chemist, at a cost of Rs. 15,700 each was sanctioned in G.O., No. 186 W. of 9th February 1907. Quarters for fifty menial servants at a cost of Rs. 14,675 were sanctioned in G.O., No. 377 W., dated 27th March 1907, and eleven quarters for native subordinates in G.O., No. 1596 W. of 31st July 1906, at a cost of Rs. 61,280. Rs. 29,800 were allotted for farm buildings in G.O., No. 1442 W., dated 7th July 1906, and Rs. 11,000 for a rest-house for the accommodation of officers visiting the farm in G.O., No. 631 W., dated 17th March 1906: a total of Rs. 6,10,855. The rest-house has been finished; good progress has been made with the other buildings in spite of difficulties caused by unseasonable rains and an outbreak of cholera on the works, and an estimate for a student's hostel has been submitted to Government. A proposal is under consideration to erect a temporary laboratory and lecture room to enable the first batch of students to be admitted in January 1908, as the main building cannot be ready by that date.

A new agricultural station was opened at Nandyal for the study of the "Northerns" cottons, and this has been laid out, the buildings erected and the land brought into good condition.

At Hagari a great deal of laying out of the land has been accomplished and the farm buildings are in course of erection. A rest-house and quarters for the Manager have been built at Taliparamba. Those at Samalkota and Koilpatti are not yet completed. A seed store has been put up at Palur and Bellary. An area of $7\frac{1}{2}$ acres has been added to the Bellary farm.

M.R.Ry. R. V. Subramania Aiyar, Acting Second Assistant in the College of Agriculture, Saidapet, is engaged on surveying and mapping all the farms. Coimbatore, Koilpatti and Palur have now been completed.

The instructions conveyed in paragraph 3 of G.O., No. 624, Revenue, dated 5th July 1906, regarding the opening of a new agricultural station in Tanjore are being kept in mind, but at present owing to the want of experienced subordinates it is not proposed to open any new farm during the current year. The Agricultural Inspector in charge of the Palur Agricultural Station was, however, deputed for a short tour in the Tanjore district to help the ryots who are taking up the cultivation of sugarcane there with advice, to choose suitable plots for the experiment in jute which the local agricultural associations are undertaking, and give the landholders instructions in regard to its cultivation. The Agricultural Inspector from Samalkota was deputed to Malabar to select land for jute cultivation and tell the landowners there who are undertaking the experiments how to cultivate it.

8. *Crops—Sugarcane.*—The experimental work at Samalkota has been continued on the same lines as last year. Disease is becoming less year by year in consequence of the careful cultivation and selection of healthy setts for planting. Several new varieties have been introduced from Java, Barbadoes and Mauritius. The best varieties were distributed as usual to the ryots and there was a keen demand.

The new canes are making rapid progress in the Godavari delta. A small experimental nursery for distribution has been opened on "upland" land near Samalkota. The well sunk in the land proving unsatisfactory, only an area of about 40 cents. was planted up. The canes are doing fairly well. At Palur the canes from the Palur farm and most of those from Melrosapuram also were distributed free this year to the ryots. The necessity for this is explained in the scientific report. It is hoped that the new canes will soon get a good hold on the South Arcot district. Messrs. Parry & Co. of Nellikuppam, who buy nearly all the canes grown in that part of the district are doing everything in their power to encourage the ryots to plant the Mauritius canes. The real difficulty here is the uncertainty of the water-supply. This year the channel which supplies this part of the district was closed for repairs in April, the month when the canes should be planted. It is hoped that better arrangements will be made next year. A cane-nursery of about $3\frac{1}{2}$ acres was opened at Melrosapuram in the Chingleput district. It was hoped that the æirmotor would supply sufficient water for irrigating the crop. The winds in the months of January, February and March proved insufficient to work the motor for more than a short time daily, and the oil engine had to come to the rescue. The crop was fairly good, except on some saline patches, but the demand for the canes locally was almost *nil.* In the end they had to be sent to Palur for distribution. A rattoon crop is being grown this year.

9. *Ground-nut.*—Both the irrigated and the rain-fed crops on the Palur farm suffered severely from the drought in the early part of the year and the excessive rains in November and December. Several new varieties have been imported and are being grown for comparison with the local variety. A set of manurial experiments has been laid down to ascertain the manurial requirements of the plant. Important cultivation experiments are also in progress with a view to reducing the present high cost of cultivation by hand-labour. This crop was introduced at Hagari and Koilpatti, but at both places it was much damaged by insect attacks. It is being tried this year at Samalkota, and promises to do extremely well there. There has been a good demand for seed from many parts of the Presidency, and it is clear that this important crop will be grown much more widely in the near future, as its merits become better known.

10. *Pepper.*—Two new varieties of pepper, Wynaad and Burma, were introduced. Experimental plantings of standards included Garuga pinnata, spondias mangifera, and nattukaryam. The common standard is the Erythrina indica. Various kinds of manure were tried. Disease is prevalent on the farm, and continual planting has to go on to replace the vines which die. No results are to hand yet. The Government Botanist published a bulletin on varieties of the cultivated pepper during the year.

11. *Cotton—(a) Seed distribution* was attempted in the Guntur, Bellary and Tinnevelly districts. In the Guntur district the seed was purchased by an agent of Messrs. Ralli Brothers. Insufficient attention appears to have been paid to the selection.

In all 511 candies 5 maunds of kapas were purchased, yielding 359 candies 12 maunds of seed. In spite of every exertion on the part of the Revenue officials only 62 candies 16 maunds were sold for seed purposes. The balance was disposed of as cattle-food. The Collector reports that the crops grown from the seed distributed do not show any superiority over the ordinary ryots' crops.

In the Bellary district 78 maunds of farm seed was sold without difficulty. Its superiority over the seed grown on the ryots' own lands was so well understood that the extra price of one anna in the rupee charged proved no obstacle to its ready sale. Eight hundred and fifty one maunds of seed were purchased from the best ryots' crops available by the Agricultural Inspector but this was little appreciated. Only about half of this was sold for seed, the balance being disposed of for cattle-food. Pressure of other work made it impossible to inspect many of the crops raised from the seed thus distributed, but in such fields as were visited the seed was found to have been mixed.

In Tinnevelly, where pure strains of uppam and karunganni have been developed on the Koilpatti farm, the two varieties generally found mixed in the ryots' fields, the demand for the farm seed was keen. The ryots fully appreciated the superiority of the farm-grown seed.

At Virudupatti in the same district Messrs. Harvey & Co.'s Agent, Mr. Steele kindly collected 118 pothies (1 pothy = about 250 lb.) of the mixed seed in which uppam predominates. Forty and a half pothies were distributed by Messrs. Harvey & Co. and the balance sent to the Tahsildar of Srívilliputtúr and the Agricultural Inspector at Koilpatti. Mr. Steele has an unrivalled acquaintance with the cotton industry in this part of the district and his experience enabled him to select good kapas from the best cultivators. The seed was reported to have good germinating power, but to be far from a pure sample.

Rupees 3,000 was allotted by the British Cotton Growing Association for this Presidency. After careful consideration it was decided that it could best be expended in enlarging the area under the pure karunganni variety in Tinnevelly. It was found that in a few villages round Vagaikulam, about 12 miles north of Tuticorin, pure karunganni only is still grown. It was decided to expend the grant from the British Cotton Growing Association and to add to it Rs. 1,700 from the budget grant in purchasing kapas of pure karunganni. The lint is being sent to the British Cotton Growing Association for sale, as desired by them, and the seed will be distributed among the ryots. The seed, though pure to type, is from a poor stunted crop, and will require good cultivation to make it fit for distribution again next year.

The result of the year's operations showed that, while seed slightly superior in germinating power to the ordinary ryots' seed can be selected by an experienced cotton buyer, such as Mr. Steele, who takes an active interest in the matter and has a personal knowledge of the best cultivators, a pure sample cannot be obtained by this means. Seed purchased by an ordinary buyer is no better than what the ryot can get through the ordinary sources of supply. It also showed that, while the ryots do not care to buy seed selected from crops grown in the ordinary way, they are not slow to see the superiority of seed grown on the Government farms with proper cultivation. These results are what might have been expected, in view of the well-known fact that cotton responds in a very marked manner to good cultivation. The preference of the ryots for farm seed seems to show that they are aware of the beneficial effect on the cotton plant of good cultivation. It is important to notice that the lint from the crops grown on the Koilpatti farm, where the cotton is drilled, and weeded with bullock-hoes, already shows a decided improvement over lint from crops grown by the ryots on their own lands where the crops are grown broad-cast, a method which precludes much after-cultivation. These facts have an important bearing on the lines on which work will be proposed for the present year. It may be inferred that the poor quality of some of the Madras cottons is partly due to long-continued bad cultivation. If good seed were available in large quantities, which is not the case at

present, its distribution among the ryots would effect no permanent improvement. Under their present methods of cultivation, it would soon revert to its former state. The distribution, of good seed should, therefore, be accompanied, if not preceded, by efforts to improve the ryots' methods of cultivation.

(*b*) *Premia for ryots who cultivate pure cotton.*—The premium of two annas an acre offered to ryots who grow "practically pure" cotton in certain taluks of the Kurnool and Cuddapah Districts was claimed in respect of 12,700 acres and 3,670 acres in 1906 and 1907 respectively. Of this area 2,400 acres was admitted as having qualified for the premium last year. The Collector recommends the payment of the premium in respect of 1,948 acres this year. The matter is still under correspondence. It may be doubted if such a small sum as two annas per acre, which could not pay the ryots for the extra trouble and expense involved in selecting or purchasing pure seed, is really an effective inducement to them to exercise any seed selection.

(*c*) *Cotton experiments on the Government Agricultural stations.*—At Hagari experiments are being carried on with Egyptian cotton planted and sown in basins fertilized by repeated floodings with silt-bearing water. Experiments in irrigating the local country cotton and spacing experiments are also in progress. Though the seed is drilled in this part of the country, the seed rate is clearly excessive, and the plants are too crowded to permit of free growth.

At Bellary and Koilpatti the permanent manurial experiments on cotton were continued, but the results were not available at the close of the year. The same remark applies to the other cotton experiments at these stations and at Nandyal. The picking season is not over till some time after the end of the period fixed for the annual reports. The hybridized cottons at Koilpatti and Bellary produced a number of fine plants and at the latter place the best bolls were selected for next year's sowing. There has not been time yet to examine the lint in detail. The study of the "Northerns" cotton was commenced at Nandyal, but the best seed obtainable locally was found to be very mixed, even when great care was exercized in the selection. Experiments in growing perennial exotic cottons under irrigation were continued at Attur in the Chingleput district; the results are sufficiently encouraging to justify a continuance of the work.

The most instructive experiments in connection with cotton this year were the different cultivation experiments. At Hagari and Bellary the after-cultivation with the country bullock-hoe was much more thorough than on the ryots' lands. The farm cottons in consequence were green and healthy in appearance in striking contrast to the dried up and stunted crops on the surrounding ryots' lands. For the reason given above, the results of the deep *versus* shallow ploughing here and at Koilpatti are not available yet. In the Tinnevelly district the cotton crop is sown broadcast, and little after-cultivation is possible on account of the heavy expense of hand-labour. The crops are therefore at the mercy of the seasons, and a partial failure occurs whenever there is a long period without rain. At the Koilpatti farm the cotton has been sown with the drill, and well cultivated during the early stages of growth with the bullock-hoe. In a dry season like the last one the effect which these methods of tillage had in the conservation of soil moisture was very striking. While the crops on the ryots' lands round the farm were stunted and dried up, ours were well grown, green and healthy, even on one large field to which no manure had been applied. A large meeting of ryots was convened by the Director of Agriculture in March, and the methods by which these results had been obtained were explained. It is believed that genuine interest was taken by the ryots in the new implements, the extreme simplicity and cheapness of which attracted their attention at once, and was the subject of favourable comment. Arrangements are now being made to lend a large number of sets consisting of drill, scuffle and bullock-hoe to selected ryots free of cost this year. Lessons in the use of the drill are being given on the farm during the hot weather to any ryots who come for instruction; their bullocks are also trained when required. The Tinnevelly cotton grower is already a very careful and industrious cultivator, and in the preparation of his land is ahead of the ryot of the Ceded districts. It is therefore hoped that, if he can be taught the use of the Bellary implements for sowing and after-cultivation, excellent results will be obtained as regards both the quantity and quality of the crop.

(*d*) *Cotton Expert.*—Proposals were submitted for the entertainment of a Cotton Expert for this Presidency, but the Government of India considered that it was inadvisable at the present time to recommend the creation of such an appointment.

12. *Paddy.*—Experiments in paddy cultivation on black-cotton soil with irrigation are to be an important branch of work on the Hagari farm. A few small plots were planted this year, but the results are not worth recording as they were not on pure regada soil. It is hoped to bring a fairly large area under paddy this year. The chief difficulty is the want of coolies who understand wet cultivation. There is very little wet cultivation in the vicinity of the farm and the few coolies who understand this work are always fully employed at this time of year. Efforts are being made to secure the requisite labour.

Banku paddy has been tried at Samalkota and on the Coimbatore Central farm and at Saidapet. It has given good results in all cases. This variety lends itself well to single seedling planting. The yield is good, the crop ripens early, and the rice fetches a good price although new to the people.

The paddy crop on the red soil area at Koilpatti was a failure for want of water, and paddy growing will not be attempted again here.

On the Saidapet farm an interesting comparative paddy manurial experiment consisted in testing sunn-hemp ploughed in green against Parry & Co's. mineral fertilizer. The sunn-hemp produced about 2 tons of green manure; 182 lbs. of the mineral fertilizer were applied. The result was in favour of the green-manuring, ·41 acre of land under this treatment producing 1,245 lbs. of grain and 1,250 lbs. of straw; while ·43 acre treated with the mineral fertilizer only produced 1,128 lbs. of grain and 1,032 lbs. of straw.

13. *Jute.*—Jute, sunn-hemp and gogu (*Hibiscus cannabinus*) were grown on comparative plots at Samalkota in both seasons. The results of the first crop were fairly encouraging, the fibre being of good quality though the yields were only moderate. The cold weather sowings were a failure both here and at Palur. Further experiments are being made on the Samalkota farm, and on ryots' lands in the Gódávari, Tanjore and Malabar districts. The experience gained up to date points to the fact that Bengal jute should be sown early in the hot weather, as it is extremely sensitive to water-logging in the early stages. All that can be said here at present is that the Gódávari jute plots are decidedly promising, and there are good grounds for thinking that this crop can successfully be introduced into that district. It appears to be more drought resistant and less susceptible to insect attacks than 'gogu.' The Government Botanist paid a short visit to the Cuttack jute farm in August last with the Bengal Jute Expert to study the methods of cultivation in force there.

14. *Tobacco.*—Some experiments were conducted by Messrs. Spencer &.Co. of Dindigul at the expense of the department with a view to seeing if an improved wrapper of Indian leaf could be obtained by better curing. The reports on the cheroots submitted to various firms were not wholly unfavourable, and it is intended to continue the experiments on the return of Messrs. Spencer & Co.'s Manager from England. A small quantity of Borneo tobacco seed and Sumatra seed for wrapper tobacco was procured and supplied to Mr. T. H. Barry of Cocanada for experiment, on the lankas, where at present only a coarse variety is grown.

15. *Agave.*—Pressure of other work has prevented much attention being paid to this subject during the past years. A sample of fibre produced on the Hindupur plantation has been sent to the Imperial Institute for valuation. Instructions have been issued for the extension of the plantation either at Hindupur or in selected localities in the neighbourhood and this will be taken up as soon as the state of the work at Hagari permits.

16. *Paspalum dilatatum*—has been tried on several of the farms. It will not live in the dry season without irrigation, but may make a useful fodder grass if planted along the sides of irrigation channels. Even under these conditions, though it grows well, it does not attain the size and luxuriance said to be typical of it in Australia.

17. *Flax.*—A small quantity of flax seed was received from the Director of Agriculture, Bengal, and distributed to the Assistant Superintendent, Land Records, Coorg, and some private individuals. No results are to hand yet. In some cases it

appears to have been too late in the season when the seeds were received. On the Central Farm at Coimbatore the Principal reports that the temperature was evidently too high for it, as the plants came up well, but stopped growing very early, only being about 15″ high when ripe.

18. *Reclamation of saline lands.*—A lengthy series of experiments has been carried out in the Sivaganga zemindary by the lessees. Their report has been received, but till the plots themselves have been visited by the Deputy Director no opinion can be pronounced. Similar experiments have been conducted by the Public Works Department in Therkutheruvu village in the Madura district for the last four years. The treatment consisted of applications of avarai (*cassia auriculata*) leaves and red earth. The yield per acre, which was only 3·2 measures in the first year, rose to 185—1 measures last year. An attempt was made to induce some ryots in the Periyar tract to reclaim saline lands in accordance with instructions issued by the Deputy Director of Agriculture. The treatment was to consist of cutting trenches to carry off the saline matters, and manuring, and the assessment was to be remitted in cases where these instructions were carried out. Only one ryot qualified for the remission of assessment. The experiments will be continued.

19. *Agricultural Exhibitions and other work of the Agricultural Associations.*—Cattle Shows and Agricultural exhibitions were held at Ongole, Bobbili, Pittapur, Ellore, Narsapur, Conjeeveram, Kothacheruvu (Anantapur), Madura and Tinnevelly, and an Agricultural and Industrial exhibition at Cannanore. Money grants for prizes were made by Government at several of these shows. The Ongole show has spread the fame of the Ongole cattle far and wide, but the cattle-owners have now got an exaggerated idea of the value of their animals which restricted business this year. A good deal of interest in agriculture is no doubt excited by these exhibitions. It is more difficult to get the associations to undertake any practical demonstrations of improvements in cultivation. Several of the associations, however, are doing useful work. Amongst these may be mentioned some experiments with sunn-hemp fibre conducted by the Ganjám association; the Gódávari and South Canara associations are introducing groundnut into those districts. The Salem, Tinnevelly and South Canara associations have introduced the Mauritius canes. Paddy spacing experiments have been tried in Malabar. Jute in Malabar and Tanjore. Mr. Markandaya Sastri of the Ongole association has a small experimental farm on which he is trying ground-nut, and Cambodia cotton with promising results. The Madura association has bought an oil-engine and a cane mill. The Kurnool association is trying some imported cottons. The Penukonda association has its own agricultural journal, and is doing useful work in several directions. Every effort is being made to get the associations to take advantage of the concession made in G.O., No. 1084, dated 8th May 1907, in which financial assistance was promised to associations undertaking specific experiments approved by the Agricultural Department. The Officers of the department take every opportunity when on tour of interviewing the leading men in those associations which show signs of vitality, discussing agricultural matters with them, and encouraging them to initiate demonstrations of useful implements and methods. It is felt that the enthusiasm which is too often confined to public platforms might, if enlisted in the cause of field work, create a most valuable link between the department and the ryots. The latter are at present apt to be under the impression that all the operations on the Government farms are conducted on too expensive a scale to have any practical interest for them. Demonstrations carried out on their own fields by the associations with their own cattle and labour would at present make more impression on their minds.

IV.—BOTANY.

20. The report of the Acting Government Botanist is printed as an Appendix, and it appears unnecessary to summarise it here. The greater part of the Government Botanist's time and attention were taken up by the management of the Samalkota, Palur and Talipa ramba Agricultural Stations, of which he was placed in charge pending the appointment of the second Deputy Director. The Systematic Assistant Mr. Tadulingam did some botanical touring on the Nallamalais. An Economic Assistant was appointed a few days before the end of the year.

V.—AGRICULTURAL EDUCATION.

21. From the commencement of the year the College of Agriculture was transferred from the control of the Educational Department to that of the Board of Revenue. The report on the farm is appended. The number of students at the Saidapet College of Agriculture was reduced to 17. The College is to be closed in January next, and therefore only one class remains. Four students secured the diploma of the College. It is noteworthy that neither of the two students who passed first and second in the examination were willing to take up posts in the Government service. This is encouraging as showing that a knowledge of agriculture secures a career outside Government service. The acting Vice-Principal remarks that, so far as he knows, no ex-student of the College is without employment. It is hoped to avoid any break in the continuity of the teaching of agriculture in the Presidency by commencing work at Coimbatore in temporary buildings till the College and Research Institute is finished.

Nine apprentices sent by the District Associations and the Central Agricultural Committee were trained on the Government farms for varying periods. Too often these men are not genuine agriculturists. If intelligent ryots were chosen who were already familiar with the crops grown on the farms, they might acquire much valuable information.

22. The number of publications received from and sent to other Provincial Departments and countries was as under—

Number received	Indian	336
	Foreign	575
Number sent		22

CAMP KUMBAKONAM,
27*th July* 1907.

M. E. COUCHMAN,
Director of Agriculture.

APPENDIX I.

ADMINISTRATIVE REPORTS OF THE AGRICULTURAL STATIONS AND THE MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES DURING THE YEAR 1906-1907.

Agricultural Stations.

General.—The year under report has witnessed several changes in the personnel of the staff. At the commencement of the year Mr. Benson was in charge of the department, with the title of Deputy Director of Agriculture, and his head-quarters at Madras. This title ceased when he resigned; and on the 15th June, I took over charge from him, as Superintendent of Farms, my head-quarters being removed to Coimbatore on the 1st August. The title was again changed towards the end of the year to Deputy Director of Agriculture.

2. The commencement of the year saw the work of the department largely increased. Besides the management of the Bellary and Koilpatti farms, and the agave plantation at Hindupur, four new farms were opened during the year, and got into more or less working order. Of these, the most important was the farm attached to the Central Agricultural College at Coimbatore, consisting of some 390 acres of dry red and black soil, and 45 acres of wet land. Besides this a large pumping station and farm at Hagari, a cotton farm at Nandyal, and an irrigation farm at Attur, were all equipped, laid out and cultivation started.

3. On 2nd January I handed over charge of the Agricultural Research Institute, Coimbatore, to the Principal, Mr. Shepperson, and was thus enabled to give more attention to the district farms. The other stations mentioned above continued to be under my charge during the year.

4. Mr. Benson or myself were on duty the whole of the year, with the exception of two days' casual leave in January. Our journeys involved the spending of 227 days in camp, and the travelling of 19,577 miles by rail, and 196 miles by road.

5. M.R.Ry. Rao Bahadur C. K. Subba Rao Avargal, Sub-Assistant Director of Agriculture, was on furlough till 14th June 1906. From 15th June to 18th August 1906, he was in charge of the Central farm. From 18th August 1906, his head-quarters were transferred to Bellary, where he remained in superior charge of the Bellary, Hagari, Nandyal and Hindupur Agricultural stations. Most of his time was spent in immediate supervision of the farm work at Hagari, with frequent inspection visits to the other places. M.R.Ry. R. Ramaswami Aiyar continued in charge of the Hagari station until 18th August 1906, when he was transferred to Coimbatore. Certain frauds perpetrated by the Inspector during the time he was in charge at Hagari, having come to light, he was suspended from the 15th December 1906. The Overseer at Hagari and the Inspector at Bellary changed places on 9th November 1906. The Nandyal farm has been under the charge of M.R.Ry. S. Raghunatha Rao since the beginning of the year. The Inspector at Attur was unchanged. The Inspector at Koilpatti was transferred to the Principal, Agricultural Research Institute, on 14th December 1906, when the Probationer A. V. Tirumuruganatham Pillai was placed in charge. L. S. Natesa Aiyar and S. Ramasami Pillai were also transferred to the Principal. The latter later in the year was deputed to special cotton work in the Tinnevelly district under my charge. Three Probationers were appointed during the year—K. Sankara Aiyar on 28th May 1906, M. V. Raghavalu Nayudu on 9th November 1906 and T. R. Venkasami Rao on 21st March 1907.

The Hagari Agricultural Station.

6. This station has been in existence just a year, the land having been handed over on 30th March 1906, and work commenced shortly after that date.

Experimental work on the farm has accordingly been somewhat desultory, though the main objects of the station have not been lost sight of, and it is hoped that a real start has been made. Much difficulty has been experienced in obtaining sufficient labour since the district is a thinly populated one, while the demand at Hagari has been increased by the work proceeding under the guidance of the Professor of Engineering on special duty. The need of constant supervision at the Coimbatore Central station, until the arrival of the Principal, prevented me from spending as much time as I should have liked at this station, and the experimental work suffered therefrom.

7. Even now the initial difficulties have not been entirely overcome since the water-supply has not yet been proved, while the need of farm buildings is strongly felt.

8. The basins constructed in accordance with the proposals of the Professor of Engineering on special duty were completed about the middle of August 1906, and from that time onward were repeatedly filled with silt-bearing water. Each tank had about 4-acre feet of water.

Great difficulty was experienced in getting the land sufficiently dry to sow, and it was not until 18th November that the first basin, field No. 8, was finally transplanted with Egyptian cotton. The other basins were sown on the 12th and 13th of January 1907, respectively, the cotton in all the basins is looking well, but has not yet come into bearing.

9. Egyptian cotton for comparison is also being grown in two other sites. Experiments in watering this cotton both in the basins and outside have been carried out on a small scale. The irrigation of a small plot of jowari cotton is also being tried: the water was not applied until rather late in the season, but the plots are looking green and could be readily picked out at a distance. An experiment on the spacing of cottons was initiated on the same lines as experiments at Bellary and Koilpatti.

10. Paddy was grown on 2½ acres in field No. 10, though the soil is not black soil. Some useful information was obtained on the value of green manure from the results obtained off 15 plots: these results being largely corroborated by the present appearance of the plots laid out in field No. 21, where a series of plots testing

(*a*) the manures to be applied to paddy, and

(*b*) the best time for planting this crop on black soil, have been laid out.

11. Of other experimental work little need be said. The area to be put under irrigation was measured and the yield of equivalent acres carefully determined. This will be laid out as soon as labour is available after harvest. A few simple manurial tests on ground-nut were tried, but this crop suffered to such an alarming extent from insect pests that no results of any value were obtained. This attack is of interest inasmuch as the crop is an absolutely new one in the district and was sown on soil hitherto uncultivated. The matter is engaging the attention of an Entomological Assistant. The rest of the farm land was cropped in the ordinary way: jonna (A. Sorghum) either alone or mixed with Bengal gram occupying some 87 acres, while jowari cotton pure or mixed with korra was sown on 25 acres, other crops included Egyptian cotton, safflower, coriander, sweet potato, maize and various kinds of grains.

12. Other work carried out during the year under report consisted in the laying out of the farm generally—the making of roads and drains, the fencing of the whole area, the construction of water-supply channels, the repairing of the bunds, levelling in various fields.

The farm bullocks continued in fair health all the year.

The Bellary Agricultural Station.

13. The chief item of importance to be recorded in this station during the past year has been the acquisition of about 7·5 acres lying to the west of the farm. This it is hoped to add to by the enclosure of a piece of jail waste to the south which will render the farm more compact.

14. The new field was not handed over until the season for sowing was getting late. It was put down to *jonna* (Andropogon sorghum) and Bengal gram.

15. The permanent farm experiments were all maintained. The cultivation plots were cropped with cotton and korra, and as the cotton season is not yet complete, nothing can be said;—the same is the case with the permanent cotton experiments, and the variety cotton tests.

16. An experiment in thinning cotton was tried in field No. 3. Results are not yet available. The hybridised cottons were again grown in 72 plots in field No. 1. It was decided to select from them good bolls of the type required, irrespective of their parentage. Some will be again grown as material for further selection next season.

17. The rotation manurial plots were this year under mani crop *jonna* (A. sorghum). The yields obtained here are again very uneven, and will require careful analysis before a definite conclusion can be arrived at. The *mungari* or early sown *jonna* in field No. 5 was got in under very good conditions. Thirty-one varieties were sown mostly in 25 cent plots. Some of them did badly, but the crop on the whole was fair, and returned Rs. 6 per acre profit. Half a dozen of the best varieties will be selected for further trial next season.

18. Many of these crops suffered to a varying degree from insect pests, which were somewhat serious this year. The *jonna* especially, both early and late, was rendered patchy by the presence of stem-borer, while an attack of aphis, rendered more virulent by the unfavourable weather, did some havoc in December.

19. This completes the purely experimental work on the farm. Other crops grown in the ordinary course comprised *kandi* (cajanus indicus), Bengal-gram, chillies, and brinjals, the two last under irrigation. The cocoanuts on the farm were given a little manure, as they appear to have been almost stationary in growth. Paspalum was replanted, but has proved very poor being unsuited to dry conditions.

20. A certain amount of clearing has been done; two hedges, one between fields 2 and 3, and the other between No. 6 and the new field, having been completely uprooted.

The farm livestock continued healthy during the year.

21. Three apprentices were trained for short intervals during the year, and two probationary Court of Wards' Home Farm Superintendents were stationed for a month at the farm, in order to familiarise themselves with the use of the Ceded Districts implements.

The Nandyal Agricultural Station.

22. As the land for this station was acquired only on the 5th April, the year under report has been the first year of this station's existence. The most important part of its work lies in the investigation of "Northerns" cotton, but since picking is still in progress, the results are not yet complete. The land was cultivated from the end of August onwards through the hot weather by means of hired labour. Half the land was sown in June with four varieties of *jonna* (A. sorghum), three from Bellary and one local. The yield of grain was poor, since they were sown thick for the production of fodder. The exact figures were from 21 acres of land — 1,288 lb. grain and 22,000 lb. fodder. This outturn may be valued at about Rs. 140; the cost of cultivation was Rs. 73. This field was afterwards cropped with Bengal gram and horsegram. The former failed entirely, the latter produced 2,788 lb. grain, and some 4,000 lb. fodder, the whole valued at some Rs. 140; the cost of cultivation was Rs. 91. The fodder has been stacked on the farm for the future use of the farm animals.

23. The other half of the land, with the exception of about 30 cents put down to horsegram, is being cropped with varieties of "Northerns" cotton, some having been tranferred from Bellary, and some from stocks selected at the cotton growing centres of the "Northerns" district. The yield up to date has been very satisfactory owing to careful cultivation and good seed. The farm land is however generally in good condition both in this field and in No. 2.

24. The rest of the work done on the farm has been the erection of the farm buildings, namely, quarters for the Inspector, cooly lines, cattle and implement sheds, manure-pit and office. These, though actually completed before the end of the year, I have not been able to pay for entirely, owing partly to the closing of the treasuries for the Easter holidays, and partly to the fact that my tappal went astray when on tour in the Tinnevelly district. The grant sanctioned for fencing has also not been spent: I did not realise until too late that the work had been transferred to the Civil side from the Public Works Department and had to be executed departmentally. This occurrence has, however, enabled me to take up a strip of road poramboke lately handed over by the Revenue Department, thus allowing a good wide headland for turning the bullocks.

25. In accordance with the instructions conveyed in B.P., No. 78, Press, dated 11th March 1906, I have arranged for some experiments calculated to discover the value of indigo as a rotation crop, and plots for this purpose have been marked out. The investigation and selection of the varieties of cotton and *jonna* found in the district will be a main part of the experimental work at this station during the present year, while observations on the early and late sowing of certain local and imported varieties of *jonna* (A. sorghum) are also considered worthy of attention.

The Hindupur Agricultural Station.

26. No experiments were carried out at this station during the year. The plants grow very irregularly, and while some are splendid specimens, others are barely alive. On the whole, however, the plantation cannot be said to be in a completely satisfactory state. Samples of soil have been taken in order that the soil may be analysed, as it seems possible that a cause may be found in this direction. The plantation was inspected at intervals and the watchman in charge given orders concerning the care of the nursery beds and the weeding of the plantation. The suckers in the nursery are growing satisfactorily, and sufficient have now accumulated not only to fill up gaps, but also to extend the plantation. No fire occurred during the year. A few plants have poled.

The Koilpatti Agricultural Station.

27. The year under report has here also witnessed an expansion of the station area, a large block of land being taken up in the black soil to the west of the land already belonging to the farm. This has enabled a larger area to be put down this season in cotton for the purpose of seed-distribution, an important part of the work of this station.

28. The different permanent experiments were continued this year with varying success. The rotation manurial plots were cropped with cumbu, which suffered severely not only on the farm, but throughout the whole district, from Pachali (green bug). This combined with unseasonable weather almost completely wiped out the first crop of cumbu, a small picking being got only from the later growth. The imported cumbus, "Awned cumbu" and "Bhownagri cumbu," both suffered severely from the same cause, the latter from its early habit having to bear the full brunt of the attack. The cotton crop also suffered, though not to the same extent, from stem-boring insects. The exotic "cambodia" was the worst in this respect, the yield of the local cottons being not materially affected. All the cottons at the time of report are healthy and appear to promise well. The permanent cotton manurial plots show several marked differences in habit and should give some interesting results.

29. The cotton crosses are wonderfully luxuriant and have attracted much attention from visitors to the farm, who are becoming more numerous each year and many of whom take a deep interest in the work. The improvement effected in the farm cottons by good cultivation

was demonstrated to a number of local cultivators in March. Their interest was certainly aroused and a demand for implements may be looked for during the next season.

30. As far as the cultivation of the red soil block is concerned, there is not much to report. The land suffers from want of water, and it is a matter for decision whether it would not be better to concentrate what water is available on a few fields and crop the remainder uniformly as dry land, on which class of land no experiments have yet been made. Ragi planted on ridges and furrows, and in beds, was again compared greatly to the advantage of the former. A new foreign tobacco, Jaffna, was tried and is at present growing very well. Varieties of sweet potatoes were compared. The local variety on a slightly better soil produced the heaviest yield; but the American varieties fetch a better price from their quality and colour. Ground-nut both here and in the black soil suffered from *Surul Puchi*. The fact of the pest appearing in black soil, where groundnut was a new crop and where any source of infection in the shape of other crops of groundnut was very remote, opens up a field of investigation as to the life-history of this pest. The paddycrop was a failure owing to insect pests. Growing paddy, moreover, in such poorly irrigated land costs more than is ever likely to be recovered in the crop. A small crop of local dry paddy was also raised.

31. The comparative growth of *irungu* sorghums was continued. The slight botanical differences appear to have no agricultural importance. The figures show no decided advantage in any one sort, though the thin-stemmed varieties would undoubtedly make better fodder.

32. The experiments with paspalum continue. This grass is being grown under varying amounts of water and with varying methods of cultivation.

33. The Divi Divi in field No. 12 has yielded 250 lb. of pods. Last season an attempt was made to get the pods baled in a cotton press, but Messrs. Harvey & Co. at Virudupatti were unable to take the risk of possible damage to the machinery. There is at present no local demand.

34. Other crops grown either experimentally or in the ordinary course on the red soil were American and Caravonica cottons, Bimlipatam jute (*Hibiscus cannabinus*), black gram (*Phaseolus Mungo*), Bengalgram (*Cicer arietinum*), redgram (*Cajanus indicus*), horsegram (*Dolichos biflorus*), onions, brinjals, chillies and various fruits—pomegranates, guavas and cocoanuts.

35. Other works which were executed during the year are the building of the cooly line and cattle and implement sheds in the black soil block, the fencing of the newly-acquired land the old line of fence having partially to be lifted and re-erected, and levelling and draining in connection with the laying out of the new land.

The farm cattle continued in good health throughout the whole period.

36. During the year five apprentices were trained—two at the instance of the Central Agricultural Committee, and three from the Salem, Kumbakónam and Tinnevelly District Associations, respectively.

The Attur Agricultural Station.

37. The most important event to be chronicled during the year under report at this station was the tapping of a very good supply of water by the Professor of Engineering on special duty. The old well had not proved satisfactory, and the engine and pump were removed to the new well in September 1906 when the whole pumping installation was handed over to the Agricultural Department. The main difficulties to be faced in the profitable utilization of this water are twofold—the extreme poverty of the soil and its high porosity.

38. Attention was accordingly paid in drawing up the cropping scheme, not only to the trial of dry and irrigated fodder crops, but also to the general improvement of the soil by green-manuring. About 8 acres were sown with varieties of gram which were ploughed in. On another 14 acres groundnut was sown and proved a fairly successful crop: it was grown without irrigation. In the eastern block 13½ acres were put under four varieties of cholam: the yield was poor. A small patch of lucerne was sown: it is hoped that in the neighbourhood of Madras it will prove a profitable crop for fodder purposes. A trial was made in two plots of sunn-hemp: it failed completely in both cases.

39. Another branch of work on the farm is the experimental growth of perennial exotic cottons under irrigation, and so far the results may be considered fairly encouraging. Plots were sown in 1905, but were not put in sufficiently early with the result that though the plants grew very luxuriantly no seed was produced before the July rains. The following pickings were made and the cotton appeared satisfactory in length and quality of staple:—

Cottons at Attur (1905–1906).

Name.	Area of plot.	Yield of kapas per acre.
Sea island	·66	210
Egyptian	1·00	130
Seema pathi	·16	78
Pomidi palnad.	·16	31½
Narasaraopet	·33	12
American varieties	·20	520

At the beginning of the rainy season all the cottons were pruned and began to grow satisfactorily, but for some reason they withered in December. They have since started to grow satisfactorily, but the check they received will cause them to be late in flowering. A fresh block was laid out in the eastern block and sown in October with four varieties of perennial cottons, in order to ascertain what amount of change such cottons undergo under their altered conditions. It seems possible that these cottons would do better as annuals, and the comparison of the first year's yield, year after year, with the second, third and fourth years' of the same variety should give some interesting and valuable results.

40. Besides the perennial cottons, the department grew some 4 acres of mixed hybridised cottons for Mr. Fyson. The first lot sown unfortunately failed to germinate, but those sown late grew very luxuriantly. The Inspector has conducted the statistical portion of the experiment owing to Mr. Fyson's regrettable absence on sick leave.

41. A good deal has been done apart from the cultivation in clearing and laying out of the land. The whole of the east block has been fenced and part of the west block. This latter it is proposed to completely enclose owing to the constant trespass of cattle. Much clearing has also had to be done in both blocks. The whole work of erecting the farm buildings also devolved on the Inspector, as the work was done departmentally. Quarters for the Inspector, office and store, cooly lines and a cattle shed have been erected in the western block, while a watchman's hut has been built near the gate in the eastern block.

42. The Inspector has been in sole charge throughout the year under report. Three apprentices from the Central Agricultural Committee, the Kumbakónam and the Salem District Agricultural Associations respectively, have received training for short periods during that time.

R. Cecil Wood,
Dy. Director of Agriculture,
Northern Division, Coimbatore.

Pumping Work done at the Attur and Hagari Agricultural Stations.

Attur.—This installation is under the Deputy Director of Agriculture and has worked satisfactorily throughout the year. The well is not emptied by the 4″ pump which extracts 325 gallons per minute. One cusec could be obtained continuously without difficulty as the water is derived from the sands in the bed of the Pálár river.

Hagari.—The farm lies behind the sand dunes fringing the river and extends back for about a mile, the land gradually sloping upwards and away from the river. For the irrigation experiments it was arranged to provide a 10″ centrifugal pump capable of delivering 5 cusecs and requiring about 21 brake horse power to drive it on a lift of 21 feet which was the maximum expected in the dry weather. The delivery channel has its full supply level about 4 feet above the berm of the river and runs off at right angles into the gradually rising ground. When it gets into a cutting about 4 feet in depth, a second engine and pump lifts the water 10 feet and it is then carried still further back from the river till it reaches the limit of the land which can be commanded by water at this level. The second pumping station possesses no features of interest; the engine is of 3½ h. p. and the pump has a suction pipe 4″ in diameter and delivers 0·86 cusecs which is sufficient for the area of high land. The 10″ pump is placed on a square masonry well built on the edge of the river bank and provided with openings on the river face to admit the water. The jacket circulating water is obtained from a pot well sunk in the berm and raised by a small plunger pump. This was necessary as the river water in flood time is heavily charged with silt and would therefore soon clog the jackets. Pumping was commenced in June last year, but all the attempts to make a permanent pool in front of the pump proved a failure as a constant succession of small freshes filled up any excavations in the sand. It was found, however, that a 6 feet well sunk in the berm penetrated a bed of sand continuous with the river bed, and from this well it was possible to draw 150 gallons a minute without lowering the water level beyond a certain limit. It was determined therefore to construct a large well or pond inside the berm and to connect it with the pump well or pump by an 18″ earthenware pipe. The pond was made 25 feet square and the sides were prevented from slipping in by wells of brickwork 6 feet in diameter sunk round a square of 25 feet side. Laying the pipe to connect this pond with the pump was a tedious job as it had to be placed 10 feet below the water level in the sand at the time and the Supervisor Mr. S. Rajagopalaswamy Mudaliyar deserves great credit for carrying out the work at a comparatively trifling cost. When the work was finished it was found that the well did not yield so much water as was anticipated, the percolation amounting to but little more than 2 cusecs. It shows signs, however, of increasing and it is hoped that pumping during the flood season of this year will materially increase the rate of percolation. In the meantime the water-supply is ample for the requirements of the farm. A short masonry acqueduct connects the pump with the delivery channel and on one side of it is built a masonry tank 20 feet square and 4 feet deep for measuring the discharge of the pump. As first installed the pump was provided with fast and loose pulleys 18 inches in diameter but it was found that the speed was too great for the lift when the river was in flood,

and the loose pulley has been removed and replaced by one 21″ in diameter. To enable the engine to start easily with the driving belt on a fixed pulley the discharge pipe has been fitted with a stop valve which is only gradually opened as the engine attains its full speed. Whilst laying the pipe connecting the pond with the pump well an accident occurred due to the sudden shifting of the belt from the fast to the loose pulley. On this occasion the suction valve stuck momentarily and the water in the pump and delivery pipes commenced to run backward. The valve suddenly closed and the hydraulic shock produced was sufficient to fracture the pump casing. To prevent this in future a relief valve has now been fixed on the pump although the maximum head of water above the pump can never be more than 4 feet.

A. CHATTERTON,
Director of Industrial and Technical Inquiries.

The Central Farm at Coimbatore.

1. *Laying out and improvements.*—The fencing of the farm has been completed as far as possible having regard to the building operations in progress. This work was much delayed owing to the non-delivery of materials, many urgent letters having been written to the contractors for materials, so that the fence might be complete by the end of the financial year. A small portion on the extreme south-west of the farm is incomplete, because the actual line to be taken has not been finally decided. The bund across the tank in continuation of the western boundary of the farm has been laid out and will be completed before the rains set in. Some difficulty has been experienced in preventing human trespass, and it may be advisable to plant a line of a small species of aloe just inside the wire fence. A drain which enters the farm along the north was straightened and connected with one running north and south through the farm and constructed by the Superintendent of Farms. This will now form the main water channel across the farm, it having been found impossible to utilise the warry on the western side on account of the large volume of water often carried by it. The southern portion will be widened and well embanked before the rains set in. The road running north and south by the side of the farm buildings has been laid out but not metalled through to the southern boundary where a gate wire give access to the road leading to the wet land. An occupation road giving convenient access to several fields has been constructed from the north and south road some 10 chains to the north of the Lawley road. In other places bunds have been straightened, fields levelled where absolutely necessary, and improved means of drainage constructed.

In the eastern half of the wet land extensive improvements have been made. It was found that the land had a very uniform slope and with care a convenient series of experimental blocks could be laid out in such a way that each field, or series of two or three, could be irrigated and drained independently of the rest. This will enable experiments on water-rate, etc., to be made. The whole of the bunds have been straightened, irrigation channels and drains constructed in accordance. The main channels have been cleared and straightened as far as possible. The western half is much more uneven and no attempt has yet been made to lay it out.

2. *Farm buildings.*—The farm buildings are approaching completion, the Farm office is already occupied by the clerk. The B type quarters provided for the Inspector have been handed over and are occupied by him. A row of 6 C type quarters has also been handed over. These provide accommodation for the Assistant Manager, Mechanic, etc. Two are used as temporary office for the Farm Inspector and temporary grain-store. Considerable inconvenience has been occasioned by the delay in the completion of the grain store in the permanent buildings.

Statement of the result of paddy cultivation on the Central farm.

Number.	Variety of paddy.	Area.	Date of harvest.	Yield per acre.	Price obtained per 1 salaygay = 150 lb.
		ACS.		LBS.	RS. A. P.
1	Banku *	0·65	9th January 1907.	3,626	6 0 0
2	Tuluku samba	0·75	16th January 1907.	3,172	5 10 0
3	Sinna samba	15·00	From 20th January to 10th February 1907.	1,922	5 14 0
4	Sadasamba	29·00		1,988	5 10 0

* A crop experiment in 10 cents of fairly uniform growth of this paddy variety gave 353 lb. of paddy and 300 lb. of straw.

3. *Crops—Paddy.*—The paddy crop on the whole yielded well, although it was somewhat late.

With the exception of Banku paddy the varieties were all local —*vide* statement in the margin.

Banku was distinctly superior in yield and it also ripened considerably earlier than the others. The best local variety is the chinna (or sinna) samba, it is, however, much mixed, a large proportion of the grains in the rice prepared from it being red. The yield however was poor.

Cholam.—The variety sown was the ordinary yellow variety of the district. It was sown somewhat late and was not a particularly good crop. The rains experienced in late December and early January damaged the grain considerably making it dirty grey in colour instead of yellow. A few ears of a white cholum were observed, mixed with the yellow. Seed was selected both from the yellow and white for sowing next season.

Cumbu.—A few fields had grown this crop but it had been harvested before I took over charge in January 1st.

Ragi.—An area of 13 acres was grown under irrigation. The crop was somewhat thin and yielded at the rate of 642 lb. per acre.

Korra (or Tenai).—This was grown mixed with cotton and also alone, the *pure* korra being much the best.

Cotton.—Varieties sown were local uppam and uppam from Koilpatti together with a small area of caravonica. Local uppam was grown upon the black soil both alone and mixed with korra.

The plants on the land sown with pure cotton were much better than those on the mixed lands.

Koilpatti uppam was grown both pure and mixed with korra on the red soils and again the pure was much superior to the mixed. In the Koilpatti uppam about 20 per cent. of Karankanni together with a few stray plants of Bourboun were found. Seed was collected separately from these as also from a few other "sports" noticed. The yield of kappas cannot be said to be good. The cotton were sown late and made comparatively poor growth, many of the plants being scarcely 6 inches high. A large number were killed by the cotton stend weevil and the somewhat unseasonable rains in late March and during April damaged the quality considerably. Caravonica was sown on a small piece of light soil in December. The germination was not good, but the plants which germinated have grown well and give promise of good yield. They are however of very different types as might be expected with a hybrid variety.

Each well marked type will be separately collected and a fresh sowing made next season.

Minor crops.—Safflower was planted along the borders of fields near the boundary to prevent cattle tresspass and two small fields on the more or less saline portion of the farm were planted with it. The crop appeared to be fairly good and healthy. The yield was 464 lbs. per acre. It was found that there was not much local market for the seed as the oil is not used locally for culinary purposes, although it is the case in Bombay. It will be tried again on the poorer lands.

Wheat was grown under irrigation on an area of 6 acres. The crop was only an average one and yielded at the rate of 983 lbs. per acre. Samples of the wheat were forwarded, at his request, to the Imperial Botanist at Pusa.

Linseed was sown on three or four small fields but it is evident that the temperature is too high. The plants came up well and sufficiently thickly, but growth stopped very early so that when ripe the crop was not much more than 15 inches high. There appeared to be however a fair proportion of seed capsules formed. The crop was seriously attacked by a red rust which caused premature ripening and also by insects whose grubs penetrated the ripening capsules and devoured the young seed.

Lab-lab beans (Dolichos Lab-lab) were sown on several cholam fields in the country fashion. Grown in this way, however, Lab-lab beans occupy the land for a long time and do not sufficiently cover it, hence the growth of weeds in such fields is very great and the land becomes foul. By the time the beans are ripe, the land has become so hard that it cannot be ploughed till rain has fallen. These beans were badly infested with a pod borer.

Red gram was grown on the fields occupied by cumbu but the crop was practically destroyed by pod bores.

A small quantity of Dindigul tobacco seed had been obtained and an area of 50 cents planted. The yield of cured leaf amounted to 642 lbs. A sample of leaf is being forwarded to Messrs. Spencer & Co., Dindigul, for favor of report as to quality.

Chillies were planted on a small portion of irrigable land but the season was not right for the particular variety chosen which made good growth but produced little fruit. The crop was however seen to be very mixed and the most pronounced varieties were collected separately and seeds saved for further cultivation.

Gogu was sown early in December on a small piece of garden land. The germination was fairly good and the crop on the whole sufficiently thick. Five varieties were recognisable in the plot; so the seeds were allowed to ripen, and were collected separately; they will be sown on another piece of garden land next May.

Paspalum Dilatatum.—A few shoots of paspalam dilatatum were obtained from the Superintendent of Farms and planted at the side of a water course along which water runs daily. Up to the present it has done well; seed will be saved and further sowings made.

Experiments.—A grant of Rs. 600 having been made to the Superintendent of Farms for ensilage experiments, three pits were dug, two of which were filled with cut cholum. Up to the present these pits have not been opened, it having been intended to leave them till the period when fodder is scarcest.

A piece of land having an area of two acres was planted with paddy and irrigated by water from the well sunk and controlled by Mr. Chatterton. The plants, however, never grew well and were finally smothered in grasses, which the water was not apparently deep enough to kill.

Sugarcane.—A piece of garden land was selected by the Government Botanist sometime before January for the purpose of growing varieties of Mauritius canes alongside local canes. The land was well worked by the country plough and manured with 86 loads of cattle manure. Six plots each of 30 cents were laid out, levels were taken and a series of trenches were made across each plot, following the level; these trenches were watered from a well and canes planted in them. When the canes are well up permanent irrigation channels will be made between each two rows.

These trenches are laid out with the idea of economising water. White ants and stem borers have given some trouble by attacking the sets and young shoots. The varieties sown are:—Red Mauritius, and striped Mauritius from Palur Agricultural station, ashy Mauritius from Samalkot Agricultural station, local white cane (vellai) from Coimbatore, local striped (namam) from a village 20 miles north. On the wet land about 2 acres have been set aside for sugarcane, the variety chosen being vellai which will be planted at the end of May. The land has been well manured by sheep-penning and tank silt has been added to improve the level as well as the quality of the soil.

During the next season the crops will be carefully examined with a view to seed selection and it is hoped that reasonably pure strains of the various crops may be obtained.

Weather.—This season has been characterised by an abnormal amount of rain. In late December, early January a total of 3·54 inches was registered. The tank instead of being dry in the middle of January contained water well into February. From the middle of January till the middle of March it was dry, at the end of March 1·17 inches were registered. In April, however, the rainfall was such as had not been known locally for many years. The farm gauge registered a total of 3·56 inches for 8 days' fall.

This rainfall was on the whole very beneficial, enabling the land to be broken up by the country plough and greatly facilitated the sowing of summer cholam.

COIMBATORE,
20*th May* 1907.

C. J. W. SHEPPERSON,
Principal of the Agricultural College and Research Institute and Superintendent of the Central Farm, Coimbatore.

THE SAMALKOTA AGRICULTURAL STATION.

During the year under report the Government Botanist was in charge of the station till he proceeded on leave on January 19th. The Director of Agriculture was in charge for the rest of the year.

2. The area of the farm remains the same as last year. Blocks 10, 11, 12, 19 and 20 have been levelled; the main channel down the centre has been turfed and a road laid out along the bank of the Elleru river leading to the farm. The scrub jungle which formerly covered the high ground between the farm and the river has been partially cleared, and planted with hariali grass. Avenue trees have been planted above the new road. Formerly this piece of waste land harboured jackals and wild cats which caused a good deal of damage to the canes.

3. One acre of "upland" land (*i.e.*, land not commanded by the canal) was rented in Jagammagaripetta, about 1½ miles from the farm; a well was dug, and 40 cents has been planted with canes for distribution. It was intended to plant a larger area, but the supply of water in the well proved deficient. The canes are doing fairly well. The remaining area was sown with jute on April 14th and this is a very promising crop.

4. The rest-house is proceeding slowly. There appear to have been difficulties about masons, and the construction of this much needed building has been delayed. Visitors to the farm at present are obliged to put up in the jaggery store which is unbearably hot in April and May. The Inspector's quarters are also unfinished, though better progress has been made with them.

5. *Staff.*—Agricultural Inspector V. Muthuswami Aiyar has been in charge of the farm during the year assisted by the Assistant Manager M.R.Ry. N. Sitaramaswami Nayudu, who has been on the farm from its commencement. The farm has been kept in excellent order throughout the year.

6. *Training of apprentices.*—T. C. Krishna Kurup, a former student of the Saidapet College, was sent by the Central Agricultural Committee for six months training here, which he completed in September last. E. Kamaraju sent by the Ganjám Association for a year's training will complete his course in August next. He was allowed to visit Palúr for a short time to study ground-nut cultivation.

7. *Season.*—The months of April and May were entirely rainless. The heat was also abnormal, the average mean day temperature at Cocanada, the nearest reporting station, being higher than last year by 3·5° and 5·2° in April and May, respectively, the readings culminating in an average of 112 F. for the last five days of May. The canes are planted in March and April and the canals are closed during May; this abnormal weather coming at such a time was therefore very trying to the cane crop and there were many deaths in the cane fields. The farm is favourably situated under the bank of the canal, and arrangements were made to store up water in the channels when the canals closed. This was baled out during the dry weather and the farm crops then suffered much less. It is interesting to note that the new Barbadoes seedlings Nos. 208 and 376 stood the drought well. The drought was followed by heavy rain in June, 10 inches falling between June 13th—30th. This rendered all field operations difficult and labour became scarce. In spite of these drawbacks the farm crops were satisfactory.

8. *Crops.*—During the year under report there were 38 varieties of canes grown on the farm in all 8¼ acres being under cane. They are divided into three classes—

(1) Those which are considered fit for distribution, viz., Red, Striped and Ashy Mauritius and red and green sports.

(2) *Class I*—varieties which are the more promising canes. Comparative immunity from disease is the point to which most attention is paid in the classification.

(3) *Class II*—inferior or untested canes, which are considered worth cultivating to watch their behaviour under local conditions.

A number of canes were rejected for disease, and the following were added to the collection:—Red and white Java from Madras, Purple Bourbon from Behar and Langi canes from the Central Provinces (these latter have subsequently been rejected for disease) Java seedling No. 36 and Tanna Blanche from Mauritius. The Barbadoes seedlings referred to above are being cultivated on as large a scale as possible. No. 208 in particular has a very high reputation in Barbadoes and appears well suited to the climate. While no cane has been discovered which is immune from the fungus disease, the varieties now being distributed suffer very little provided that care is taken in planting to reject all setts which are not perfectly healthy, and provided that the land is kept clean and well drained during the growth of the canes. As a result of the careful attention paid on the farm to these points disease is steadily diminishing.

9. *Distribution of canes.*—The nursery for distribution this year was 2·06 acres. There was the usual keen demand for the new canes. Care was taken to supply as large a number of persons as possible with small quantities of canes, and they were told to keep all next year's crop for planting. Those ryots who have any of the new canes to spare are able to sell them for planting at Rs. 3 per 100 or more. Only Rs. 2 is charged on the farm. There can be no doubt that the canes will entirely replace the existing variety in a few years. Not only are they less subject to disease and richer in sugar, but they are far larger than the local canes. In a crop-cutting experiment conducted on the farm this year the average weight of the local Bonta cane was 1·8 lb., while the Red Mauritius weighed 3·8 lb. At Palúr a sample of ashy Mauritius sent for analysis averaged over 5½ lb. per cane. In the manurial tests the Red Mauritius which is decidedly inferior to the Ashy and Striped, both in size and quality, yielded at the rate of 48 tons of cane and over 5 tons of jaggery per acre. The crop-cutting experiment of Bonta on the land of a ryot adjacent to the farm gave only 24 tons of cane and less than 2 tons of jaggery per acre. The area under sugarcane in the Gódávari district appears to be increasing, after the disastrous falling off a few years back and this recovery may be in part ascribed to the introduction of the new canes, which have made the industry more profitable. When the canes were being distributed the opportunity was taken to impress upon the ryots the importance of careful cultivation, and especially the bad effects of the almost universal practice of over-watering the canes, of flooding the whole surface of the field, instead of filling the trenches only and keeping the surface dry and of allowing the stagnant water to stand in the trenches. They were also shown the healthy condition of the farm canes, and the system of cultivation by which these good results were attained was explained. They are well aware of the defects in their own practices, but it is to be feared that, so long as their own slovenly cultivation yields them a fair profit, they will not reform their ways.

10. *Fibre experiments.*—A series of experiments with Bengal jute (*Corchorus capsularis*) Bimlipatam jute (*Hibiscus cannabinus*) and sunn hemp (*Crotalaria juncea*) was carried out during the year. A full report of the results of these is given in Mr. Barber's letter of 19th December last. The fibre was well reported on, the jute being valued at Rs. 11 per maund and the gogu (Bimlipatam jute) at Rs. 10–8–0. The best yield of jute was at the rate of 805 lb. per acre and of gogu 1,235 lb. Neither of these are heavy yields; the jute yield might be called poor. The best sunn-hemp crop yielded at the rate of about 805 lb. per acre, and the fibre was valued at Rs. 6 per maund only. The second crop fibre crops sown in October were a complete failure.

Jute has been sown earlier this year, on April 14th, both on the farm, on the new nursery and on three plots of ryots' lands outside the farm. The growth is very promising, and there appear to be good prospects of proving that it would be a paying crop in the delta, if the ryots could be induced to take it up. Bengal jute is evidently better suited to the delta than gogu or sunn-hemp as it suffers less from insect pests, which are often fatal to the two latter crops.

Other crops.—Banku paddy was tried and yielded at the rate of 3,081 lb. per acre. Other crops were turmeric, cotton, local and Egyptian, red gram, Budama paddy, chillies and plantains. These being only rotation crops call for no special remarks. In the current year ground-nut has been introduced and promises well.

Visitors.—The Government Botanist visited the farm on three occasions, the Director of Agriculture on two occasions and the Commissioner of Agriculture on one occasion. There were also numerous other visitors. Efforts are being made to popularise the farm by holding meetings of cultivators when anything is going on to which it is specially desired to draw their attention. It is thus hoped to familiarize them with better methods of cultivation and any new crops which may be introduced such as jute and ground-nut. At present they are too prone to dismiss all the farm methods from their notice as far too expensive for imitation. A better acquaintance with the farm would dispel this illusion (for such it is) and thus widen the sphere of usefulness of the farm.

M. E. COUCHMAN,
Director of Agriculture.

THE PALUR AGRICULTURAL STATION.

Charge and area of the station.—The Government Botanist, Mr. C. A. Barber, was in charge of the station during the year under report till January 19th, when the Director of Agriculture took charge of it, pending the appointment of the second Deputy Director. It has subsequently been made over to Mr. Sampson, Deputy Director of Agriculture, Southern Division. Towards the end of 1905-1906 it was decided to make this station permanent. The small area originally taken on lease for two years from January 1905 was purchased in 1906 and extended. The station now consists of about 32 acres of dry and 20 acres of wet land, the entire additional area having been handed over on the 25th April 1906.

2. *Season.*—The season was unfavourable for the successful growth of farm crops. The total rainfall during the year under review was 50·24 inches as against 54·40 of the previous year, but the distribution was so unequal that the crops suffered at one time from drought and at another from the continuous and excessive rainfall. February, April and May were entirely rainless, January and March nearly so; during the four months, June to September, the rainfall ranged between 1½ to 3 inches a month. In October, November and December about 42 inches fell, and this was even more disastrous in its effects on the ground-nut crop than the drought which preceded it.

3. *The objects and experiments of the station.*—The two important functions of the farm, viz., the study and improvement of the ground-nut and the introduction of better class canes, were steadily kept in view during the year. A detailed record of the experiments and results of the year will be found given in the scientific report of the station.

4. *Ground-nut—The harvesting of the irrigated crop of* 1906.—Only about 2½ acres were put under irrigated ground-nut last year. The abnormal drought affected the crops considerably. Local Mauritius, *i.e.*, Mauritius grown in India was tested against Mauritius imported from Mauritius in two duplicate plots but the results were inconclusive. On analysis the local Mauritius was found slightly superior both in oil content and proportion of kernel to shell. The following new varieties were also given a trial:—Spanish, Big Japanese, Tatas, Virginian, Barbados, Ceylon, Small Japanese, Madagascar and the old country seed. The results pointed to the superiority of the local Mauritius, which yielded the heaviest crop though the Virginian was almost equal to it. The old local variety has almost disappeared now, and it is difficult even to procure seed.

5. As regards the planting and harvesting of the *rainfed crop of* 1906, the work was chiefly confined to the growing of varieties, but the crops on the farm, in common with those in the whole district, suffered severely owing to the heavy rains of October to December, which not only reduced the yield of the crop but also the oil-content of the nuts. The "Surul" caterpillar and the "Tikka" fungus disease, always worst in the rain-fed crop, were much in evidence. The varieties most affected by the inclemency of the weather were the Spanish and the small Japanese. The Spanish ground-nut imported from America, though injured in a similar manner, was slightly better in its yield, and it is being tested now as an irrigated crop in the dry season.

6. *The irrigated crop of* 1907 was sown in February and March 1907. Fourteen half-acre plots have been laid out for experiments on the irrigated ground-nut crop. The experiments, which were laid down for the first time at the close of the year under report, consist of

manurial and varietal plots. The manures selected are burnt shell-lime with and without farm-yard-manure, fine bone dust, and powdered shells. These are all readily procurable in the country in case they should be successful. There is one no-manure plot, and one plot to which no manure will be applied, but to which the oil-cake and haulms will be returned, the oil alone being removed. In the varietal plots Tata's ground-nut, Mauritius from Mauritius, Virginian, Big Japanese, Ceylon-Mauritius, Small Japanese, and Senegal are being tested in parallel half acre plots against local Mauritius. Should any of these prove satisfactory after acclimatization they could be substituted for the existing or "local Mauritius" ground-nut in the event of this showing signs of deterioration either in productiveness, oil content or in susceptibility to disease. Several other varieties are being grown on a small scale for the preliminary study of their habits.

7. There is much scope for improvements in the ryot's methods of cultivation, and these are being investigated, the plan followed being sowing in rows followed by intercultivation with the Bellary bullock-hoe. It is expected that an economy of seed and irrigation water will be secured by this plan. It has also been found that fallow land can be kept clean from all weeds, except hariali grass, by frequent working with the guntaka (or scuffle) in the dry weather. The conservation of soil moisture by the use of this implement and the harrow is receiving careful attention.

8. *Disease and insect pests.*—As mentioned above, the rainfed crop was attacked by "Tikka" and "Surul". The irrigated ground-nut crop of 1906 also suffered to some extent. Spraying with Bordeaux mixture had no appreciable effect. The present irrigated crop is singularly free from "Surul" and but little "Tikka" has appeared. The salting of the ground as a preventive of the millipede pest was tried again, without any visible effect.

9. In the last few years there has been a remarkable spread of interest in the ground-nut crop and numerous applications for seed came from all parts of the Presidency. A good seed-store has been constructed to supply this demand. There are no doubt many other districts where ground-nut could be profitably grown in parts.

10. *Sugar-cane.*—During the year under review the work consisted chiefly of growing the best Mauritius varieties for distribution, besides the cultivation of several local and introduced varieties. Red, Striped and Ashy Mauritius having been found by their growth and analyses to be the best canes they were selected for distribution to the ryots. The closing of the supply channel from the Tiruvadi anicut in April this year, the month when the canes should be planted has caused, it is feared, a decided set-back to the cane cultivation. On this account great difficulty was experienced in inducing the ryots to take our canes for planting, while for the Melrosapuram canes there was practically no demand at all, except from Messrs. Tawker & Sons of Madras. Under these circumstances it was decided to distribute the canes free this year to avoid the necessity of crushing them, and to introduce the new canes as widely as possible into the district. A brisk demand then sprang up, to meet which most of the canes from the Melrosapuram nursery had also to be sent for. Important assistance was afforded by Messrs. Parry & Co. of Nellikuppam in bringing the canes to the notice of the ryots and offering pecuniary inducements to them to plant them in preference to the inferior local canes. Palur being more of a sugar-cane nursery than a regular experimental sugar-cane station, the experiments were few and simple. Wrapping the canes in the Gódávari manner was tried but without any marked success, while top dressings of ammonium sulphate produced inconclusive results, each application having been followed by a heavy downpour of rain which probably washed it away. The experiment of growing the canes on dry land was a failure, and has been given up this season. The growth of the canes was not so good as on wet land.

The nursery at Melrosapuram.—About 3½ acres were finally planted with canes from Samalkota on a piece of land commanded by the aer-motor. Except in some saline patches, where the canes failed, the canes grew well, considering the poor quality of the soil, but the aer-motor was not able to supply a sufficient quantity of water, and water from the oil-engine had to be used to supplement it. It appears that the winds do not blow with sufficient regularity and strength in the months of January, February and March to drive the large aer-motor effectively. There is practically no cane cultivation in the Chingleput district, and the local demand for canes was *nil* except from Messrs. Tawker & Sons. The bulk of the canes had in the end to be sent by rail to Nellikuppam and distributed free to the ryots there. It is therefore proposed to take a ratoon crop off the land this year and give up the nursery next year. The Palur farm will thereafter be sufficient to meet such demand as exists in the southern part of the Presidency.

11. *Rotation crops.*—Only a small portion of the Indigofera arrecta from Pusa germinated and it was a failure. Two cuttings of the other kinds of Indigo were obtained. The results of testing the manurial value of the refuse or seet were inconclusive owing to want of rain. Gingelly, Ragi, Tenai (Setaria Italica) and Cumbu (Pennisetum Typhoideum) were also grown as rotation crops. As regards paddy, half an acre of dry land was sown with an inferior variety of Motta Kuruvai paddy which was entirely grown as a rain-fed crop. The yield was very poor. Six acres of sprouted samba paddy was sown broad-cast, and three acres were transplanted with the same variety. This year a series of spacing experiments will be undertaken with the paddy crop.

12. *Pulses and fibres.*—Redgram sown on 80 cents yielded 375 lbs. of grain per acre while blackgram tried on one acre was spoiled by the rains. A piece of land half an acre in extent was sown with Bengal jute, Sunn-hemp and Gogu on equal areas in November 1906. Jute was a failure as the crop was subjected to heavy rains in its earlier stages and the seeds were formed while jute plants were 1 to 1½ feet high. Experience gained in the Gódávari district points to the fact that Bengal Jute succeeds best when sown in the hot weather. Mr. Finlow, the Fibre Expert to the Government of Bengal, having stated that jute might be suitable for the Tanjore delta, some seed was procured and supplied to the District Agricultural Association. The Agricultural Inspector from Palur was deputed to select suitable plots for its cultivation and to give instruction to the mirasidars who were trying the experiment. Sunn-hemp failed altogether on the farm; a small quantity of Gogu fibre was extracted.

13. *Micellaneous.*—Three pairs of cattle were purchased during the year and a cattle shed constructed. Land required for the erection of farm manager's quarters and cooly lines will be shortly acquired. A seed-store was built; most of the land has now been laid out into suitable plots for experimental work. Part of the farm was leased out last year to private individuals. This has become very foul. It has been taken in hand now and will be utilized during the coming season. Six apprentices underwent training at the station. The neighbouring ryots show considerable interest in the operations, and visitors are numerous. There is no doubt that there is a wide field of usefulness open for this farm.

M. E. Couchman,
Director of Agriculture.

The Taliparamba Agricultural Station.

The area of the farm has been increased by the further acquisition of 1·17 acres of old pepper garden and 6·90 acres of protective scrub jungle. Some 23 acres are now under cultivation. This includes about 18 acres of pepper gardens, 2·77 acres of wet land and about 1½ acres of new clearing on the more level slopes, for experimental cultivation.

2. *Pepper.*—The main work has consisted in the renovation of old gardens by terracing, digging, lopping shade, substituting vine props and new standards for dead or fallen ones and replacing new vines where vacancies have occurred.

3. A series of manurial experiments have been started and plots have been set aside for the application of fish manure, cattle manure, leaf mould and ashes; while sunn-hemp, wild Indigo (*Tephrosia purpurea*), groundnuts and *Cassia tora* have been grown as green manures. Grass and leaf mulches are also being tried.

4. *Pepper standards.*—Cuttings of muruku (*Erythrina indica*) which are the general standards for pepper in the low country have been used to substitute dead standards, except where other trees are being experimented with for this purpose. Separate plots have been set aside for these trials and these are being planted up as vacancies in the existing standards occur.

5. *Varieties of pepper under cultivation.*—Besides the local varieties, the Wynaad, Balamcottah, Kalluvalli, and Cheriakodi varieties have been introduced and the cultivated Burma variety of *Piper longum* is also under trial. Unsuccessful attempts were also made to raise plants from seed of varieties which were obtained both from the Wynaad and from North Canara.

6. *Yield of pepper.*—The yield of pepper this year is only one-third of that of last season. The shortage in the yield has been the general case in the low country and is attributed partly to the heavy crop of last year and partly to the failure of the June rains which are generally acknowledged to be necessary to set the fruit.

7. *Fodder crops.*—Trials have been made with cholam (*Andropogon Sorghum*) as a fodder crop, but so far these have not met with much success. Guinea grass (*Panicum maximum*) has also been planted out both in the shade of the pepper gardens and in the open. This is more promising, but further trials are necessary before any definite opinion can be formed.

8. *Cotton.*—Varieties of local, Egyptian, Sea Island and Caravonica cotton have been grown on hill side clearings and periodic sowings were made to ascertain the correct time of sowing. None of these have shown any promise of success and except for a few bolls of the indigenous variety none of the others have been able to mature any bolls.

9. *Other crops.*—On the wet lands, paddy was cultivated as a first crop and small trial plots of sunn-hemp, jute and Bimlipatam jute (*Hibiscus Cannabinus*) were sown for fibre as a second crop. The Bimlipatam jute is very promising, but further trials must yet be made with all three. A small trial plot of sugarcane was also planted towards the close of the year, but the crop is still too young to form any opinion as to whether it will prove successful.

10. Cocoa seedlings have been raised in a nursery for planting on the hill side clearings, while a few plants of *Ficus elastica*, shaddock, and pine apples have been planted out for trial. The Lemon grass which was obtained last year has been grown on a larger scale on an open hill-side clearing.

11. Mahogany, teak and rain trees have been raised in a nursery and have been planted out near the boundary of the farm.

12. *General remarks.*—An inspection bungalow and quarters for the Agricultural Inspector have been completed by the Public Works Department. These were handed over to the officer in charge towards the close of the year. Two wells have been sunk to supply water to these: a good deal has been done in revetting, improving and repairing water courses and drains, in cutting paths, maintaining fire lines, thatching, repairing and building huts and thinning out jungle where necessary.

13. The farm has been under the charge of an Agricultural Inspector for the whole year, who has been assisted by an Agricultural Probationer since the middle of April. This has given the former time to make a more extensive study of the pepper crop in the low country.

Koilpatti
24th July 1907.

H. C. SAMPSON,
Deputy Director of Agriculture, Southern Division

MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES.

I have the honour to submit the Administration Report of the Department of Experiments in Irrigation by pumping for the year ending 31st March 1907.

2. The establishment during the year consisted of four Supervisors and, for part of the time, of one Sub-Overseer whose services on the 10th September 1906 were transferred to the Deputy Collector who was placed on special duty in connection with the well-boring operations in the Chingleput district.

3. The work of the department during the year may be roughly classified as follows:—

(*a*) Maintenance of the installations already at work, of which there were 35 at the beginning of the year.
(*b*) Investigation of new pumping projects.
(*c*) Erection of new installations.
(*d*) Collection of data regarding the duty of engines and pumps and more particularly the duty of water.

4. Increased experience with the working of the Hornsby Cheap Fuel Engine confirms the conclusion that it is well adapted to the needs of the agricultural population in India and that even in the hands of comparatively unskilled drivers it is not liable to get out of order. Many of the installations at work have required no assistance whatever and the defects which caused difficulties in some installations were generally of a very trivial character.

5. Messrs. Parry & Co. have introduced the National Oil-Engine and have a number of them at work. A 10 h.p. engine has been lent to me to ascertain whether or not it is suitable for agricultural work and I have had it running for some time driving the workshops and tanning drums in the School of Arts. The engine is worked with liquid fuel but it has not yet been under observation for a sufficiently long time to justify the expression of a definite opinion upon its merits.

6. The visible success of the earlier pumping installations has led to a large number of enquiries on the part of ryots and land-owners for information regarding the possibility of making profitable use of oil-engines and pumps on their lands. Many of these applications could be rejected without paying an actual visit to the lands whilst others had to be classed as impracticable after detailed investigation on the spot. Of those that were deemed practicable some finally fell through owing to the inability of the applicant to offer sufficient security to enable a loan to be granted under the Agricultural Improvement Loans Act. A few applications for loans were subsequently withdrawn because the favourable character of the season last year did away with the urgent necessity which had previously existed for supplementing the existing supplies of water.

7. The most important result of the numerous investigations that have been made to ascertain the possibility of obtaining sufficient supplies of water to keep an engine and pump going is that in certain districts and over certain tracts of country it has been discovered that abundant supplies of subterranean water exist and can be raised to the surface without much difficulty. It will be convenient to submit the detailed evidence on this point in the reports of individual stations in Appendix A, the following being a summary of the results:—

(*a*) To the south of Pondicherry the artesian beds long known to exist in French territory have also been proved to extend nearly as far south as Cuddalore where however the water pressure is not sufficient to bring it to the surface and pumping must be resorted to. To the north of Madras in the basin of the Kortaliyar river, sub-artesian water has been found in large quantities

over a tract of country the longitudinal axis of which is roughly parallel to the main north road. Further inland in the same basin to the north of Tiruvallúr sub-artesian water has also been found, but the extent to which it is available has not yet been investigated. An extension of the investigations with boring tools and deep well pumps will probably bring to light the fact that in many other places along the East Coast these conditions exist. These sub-artesian supplies of water are likely to be of a permanent character as the water drawn from them will be replaced each year in the rainy season.

(*b*) Wells sunk on the margin of many of the big rivers penetrate into beds of sand directly connected with the river and as the sand is usually coarse the flow of water is very free and it is not difficult to sink wells sufficiently large to keep 3″ or 4″ pumps going continuously. Examples of this may be found on the south bank of the Vaigai near Mánamadura, on the north bank of the Coleroon near Kuhur, on the Hagari river at the Government Experimental farm and on the banks of the Pálár at Atúr near Chingleput. As sources of water-supply, wells of this type are likely to become exceedingly important as, where the conditions are favourable, they offer a simple solution of the problem of tapping the water stored in the beds of rivers.

(*c*) In the South Arcot district in the neighbourhood of Cuddalore and Villupuram, extensive beds of coarse sand have been discovered at a comparatively small depth and these yield water very freely and it is probable that in many other places similar conditions may exist, as for instance, immediately to the north of Madras, partly within and partly without the municipal limits several engines and pumps are at work or in course of erection to lift water from the underlying sand.

(*d*) In the Coimbatore district there are a number of deep wells with a water-supply sufficient to keep from 4 to 6 mhotes running and in such instances it would be much cheaper to do the work with oil engines. So far the experiment has only been tried on the new experimental farm and at the Central Jail, but a considerable number of cases have been investigated and in one instance two engines have been purchased and I hope during the year a considerable number of engines will be put down to raise water instead of employing cattle. In other districts similar wells exist but it must be admitted that the total number forms an exceedingly small percentage of the total number of wells from which water is drawn for irrigation.

(*e*) In many river channels there are perennial or almost perennial supplies of water and although a good deal of this is used by the system of spring channels, an enormous quantity of water remains unutilized and engines and pumps can, in many cases, render it available for irrigation. On the Adyar river, for instance, several engines and pumps are at work and all over the Presidency it requires but little search to find similar unutilized sources of water. The main difficulty to be overcome is due to the gradual slope of the land on each side of the river which necessitates either the erection of high banks to carry the water or pumping through long and consequently expensive mains. The most economical solution is usually to carry the water from the river by a low level channel to some distance into the high bank and then to lift it into a high level channel by means of the pump. In some cases the lift may be conveniently divided into two stages as has been done at the Government experimental farm at the Hagari river.

8. During the year under review the following installations have been erected and got into working order in addition to the completion of those mentioned in last year's report as under construction:—

(1) A 3½ h.p. engine and a 3-inch pump have been set up at Kuhur for M.R.Ry. T. Nataraja Pillai.

(2) A 16 h.p. engine and a 10-inch pump at Manoor Lanka for M.R.Ry. Duggirala Sundarasiva Row.

(3) A 14 h.p. engine and a 6-inch pump at Laccavaram for the Zamindar of Laccavaram.

(4) A 7½ h.p. engine and a 3-inch pump at Dorigallu for M.R.Ry. Venkata Reddi.

(5) A 24 h.p. engine and an 8-inch pump at Tatapudi Lanka for Messrs. Innes & Co., Cocanada.

(6) A 16 h.p. engine and a 6-inch pump at Chinta Lanka for Messrs. Innes & Co., Cocanada.

(7) A 12 h.p. engine and a 4-inch pump at Tatapudi Lanka for Messrs. Innes & Co., Cocanada.

(8) A 7½ h.p. engine and a 3-inch pump at Kotipalli for Messrs. Innes & Co., Cocanada.

(9) A 12 h.p. engine and a 6-inch pump at Surapet for Messrs. Tawker & Sons.

(10) A 5 h.p. engine and 3-inch pump at Panankuppam near Valavanur for M.R.Ry. Srinivasa Gounder.

9. In addition to the above, the several installations mentioned below have been decided upon and the machinery purchased but in most cases it is not yet erected.

(1) A 5 h.p. engine and a 3-inch pump for M.R.Ry. K. S. Srinivasa Pillai, Tanjore.

(2) A 7½ h.p. engine and a 4-inch pump for M.R.Ry. Ginjappa Gounder, Nanjaipuliampatti near Satyamangalam.

(3) A 5 h.p. engine and a 3-inch pump for M.R.Ry. T. Subramania Iyer, Timmanacharikuppam.

(4) A 5 h.p. engine and 3-inch pump for M.R.Ry. Muthukumaraswamy Pillai of Cuddalore.

(5) A 7½h.p. engine and 4-inch pump for M.R.Ry. Vaidyanatha Aiyar of Valavanur.

(6) A 7½ h.p. engine and 6-inch pump for M.R.Ry. Ratnasabapathy Mudaliar in Tondiarpet.

(7) A 5 h.p. engine and 3-inch pump for M.R.Ry. Muniappa Gramany in Tondiarpet.

(8) A 7½ h.p. engine and 4-inch pump for M.R.Ry. Balagurumurthy Chetty of Punjerikuppen.

(9) A 5 h.p. engine and 3-inch pump for M.R.Ry. V. P. Rajappa Gounder of Unjalur.

(10) A 3½ h.p. engine and piston pump for the Mysore Fruit Growers' Association.

(11) A 5 h.p. engine and 3-inch pump for the Maharaja of Bobbili.

All the above are Hornsby cheap fuel engines and though the majority have been ordered through the Pumping Department, it is satisfactory to note that several have been purchased independently.

10. For the installation of engines and pumps loans under the Agricultural Improvement Loans Act have been granted in the following instances :—

			Rs.
(1)	M.R.Ry.	D. Sundarasiva Rao, Ellore	6,000
(2)	„	P. Venkata Reddi of Dorigallu	2,000
(3)	„	V. P. Rajappa Gounder, Unjalur	2,000
(4)	„	T. Subramania Aiyar, Timmanacharikuppam	2,000
(5)	„	K. Ginjappa Gounder, Satyamangalam	2,500
(6)	Zamindar of Laccavaram		5,000

The total amounts to Rs. 19,500 which added to the previously reported loans makes the sum total lent for the purpose of oil-engines and pumps Rs. 44,000.

11. Great difficulty has been experienced in getting the owners of engines and pumps to keep any system of accounts that will furnish information of value and it is still more difficult to obtain from them a profit and loss statement. There is no doubt that the majority of the pumping stations have been worked at a very good profit as the demand for oil-engines and pumps is steadily growing and is largely from landholders and ryots who have had opportunities of seeing the working of some of the pioneer installations and who have had excellent opportunities of discovering for themselves what sort of profit can be made.

12. Although twelve pumping stations have been erected with funds borrowed under the Agricultural Improvement Loans Act, this method of obtaining capital is by no means popular and ryots are beginning to avail themselves of the hire-purchase system which has been introduced by Messrs. Massey & Co. and which seems likely to prove satisfactory.

13. Where a sufficient quantity of water can be obtained the results of the last three years' work conclusively prove that there is no cheaper method of lifting water than by oil-engines, using cheap fuel and centrifugal pumps. The installation of such machinery is no longer in any way an experiment. This result is important as it places at the disposal of the agriculturist cheaper supplies of power than he has hitherto been accustomed to, and in the future it will lead to considerable development in the employment of machinery for agricultural purposes. Rice hullers, sugarcane mills, oil mills, cotton gins and pugging mills are all now being worked with power supplied by oil-engines in some cases as independent installations and in some cases they have been introduced as the pumping work is insufficient to keep the engine running the whole time. Cattle power is from two to three times as expensive as that supplied by oil-engines and yet the number of native oil mills is extremely large. But it is almost certain that within the next few years mechanically driven mills of superior design will be forthcoming to meet a demand which has already sprung into existence, and it is not improbable that within a few years this picturesque but noisy and inefficient native method of expressing the oil from the seeds will be obsolete. Sugarcane crushing mills driven by oil-engines have proved beyond doubt extremely satisfactory and their general introduction will probably greatly stimulate the extension of sugarcane cultivation, as the difficulty of disposing of the crop is one of the reasons why few ryots care to grow it on a large scale. In the January number of the Agricultural Journal of India Dr. Lehmann, in a paper on the "Sugar Industry in Mysore" gives the results of some of the experiments made in the extraction of juice with an iron mill driven by a 6½ h.p. oil-engine and compares them with those obtained with three roller iron mills

worked by bullock power. Apart from the saving due to the employment of an oil-engine instead of the cattle, he estimates that with average prices the yield per acre will be increased in value by Rs. 50 owing to the superior extraction of the more powerful mill.

14. In the industrial regeneration of the country the oil-engine is already playing an important part and in the future it is likely to be a factor of supreme importance. In this motor simplicity and cheapness have reached the highest development and a motor suited to Indian requirements has at last been found. Slowly but certainly it is opening the eyes of the people to the advantages of mechanical methods of working and they are gradually losing the diffidence and distrust with which they have hitherto regarded anything pertaining to the Mechanical Engineer.

15. Undoubtedly the most important work to be taken up in the immediate future is the scientific exploration of the water resources of the country. A beginning was made with this last year and continued during the year under review, but the scale of operations was much too small and the results obtained only serve to demonstrate the importance of much more extended work in this direction. The most important result obtained was the discovery of sub-artesian water in the village of Surapet belonging to Messrs. Tawker & Sons. Shortly after this the Special Deputy Collector commenced work in the Chingleput district and it was necessary to place under him the services of the only subordinate I had who possessed a good practical knowledge of boring. A good deal of work has been done in the Ponneri taluk but the method of working, until quite recently, was very unscientific and the results have not been of much value. Lately, however, the adoption of a more rational procedure has led to the discovery that the Kortaliyar sub-artesian water underlies a very considerable area of country.

16. The publication from time to time of the results obtained with boring apparatus has excited an enormous amount of interest among the people of this country and has given rise to a very considerable correspondence from all parts of India regarding the tools employed in the methods of working pursued. For exploratory work, not only are numerous sets of boring tools required, but pumping power to test the inflow to the boreholes and to test the inflow to existing wells is urgently necessary. All over the country the work of advising land-holders as to the extent of their water-supply and the consequent feasibility of installing engines and pumps would be greatly simplified if we possessed a portable pumping set by means of which wells could be unwatered in a comparatively short time.

17. In the appendix figures are given relating to the actual cost of pumping water at some of the stations where accurate accounts have been kept. These are summarized in the following table which shows the number of cubic feet raised—one foot for one anna in both 1906–1907 and 1905–1906.

	1906–1907.	1905–1906.
Melrosapuram	3,900	...
Kadiampatti	4,013	6,400
Villupuram	3,230	5,800
Cuddalore	9,370	6,750
Saidapet	8,300	4,126
Katalai	...	6,500
Bezwada	3,340	3,200

The comparatively high cost of water-lifting is due in the main to the small use that is made of the pumps. At Saidapet and Cuddalore where the engines ran for long hours the cost of lifting water is much less than at other stations where the running hours were fewer. In many instances the pumps simply supplement other sources of water-supply and render, what was formerly extremely precarious, a certainty. At Katalai the pump enabled plantains to be grown instead of paddy and the plantain garden yielded at least ten times as much as the paddy fields per acre. At one pumping station it was not necessary to run the engine and pump at all as the natural sources of water-supply proved adequate; yet this, according to the owner's experience, does not happen one year in four.

18. In last year's report (paragraph 12) the meagreness of the information which had been collected regarding the duty of water was commented upon and I have but little to add to it this year. At Saidapet, Kadiampatti and Bezwada proper accounts were kept and it is possible to state what depth of water was supplied to each crop, but there is no information as to whether the irrigation was properly done or not. The principal factor in determining the duty of water seems to be the nature of the soil and sub soil. On heavy soils the duty is much higher than on light sandy soils, but it would seem that the difference between the two can be greatly diminished by careful cultivation and properly, controlled waterings. On farms where several crops are under cultivation it is impracticable to get the owners to keep accounts of the distribution of water and the utmost that can be obtained is a statement, not always correct, of the number of hours the pump has been worked.

19. The most important deduction from the results of these pumping stations is the high value which attaches to water when the supply is perennial and not liable to failure. A careful investigation of the cost of well irrigation shows that it really costs the ryots in labour and produce from Rs. 60 to Rs. 90 per acre for garden cultivation and the figures given in the appendix to this report show clearly that the cost of most pumping stations amounts to fully Rs. 30 an acre and yet a large profit is made and the adoption of engines and pumps is making good progress. Where the cost of water is considerable superior cultivation follows and the margin of profit to the ryot is not very different under the wells of Coimbatore or the canals of the Gódávery. Irrigation projects of enormous magnitude are now hung up mainly because the return on the capital outlay is insufficient. It would seem that for the certain water-supply which could be guaranteed from the Tungabhadra reservoir the ryots could well afford to pay from Rs. 12 to Rs. 30 per acre instead of Rs. 5. Similarly with the other projects, the water they will supply is really worth much more than is charged for it and it certainly seems open to consideration whether it would not be better to impose a much higher water-rate rather than not supply the water at all. It will take time to get this generally recognized and the extension of irrigation by pumping plants seems likely to prove the most potent educative influence in this direction.

20. During the year a considerable amount of attention was paid to other methods of lifting water and furnishing motive power than those adopted. Several suction gas producers plants were under observation with very satisfactory results and it is probable that in places where charcoal can be procured for not more than Rs. 20 a ton, gas engines can be used as a source of motive power if the amount required is not less than 10 or 12 horse-power. A great many improvements have been effected in the design of centrifugal pumps and constant speed pumps are now on the market that will work satisfactorily through a wide range of lift. It remains to be seen whether the complications introduced into their construction and the enhancement in their cost are fully compensated for by the undoubted improvements in their performance. The Hornsby engine and the Gwynne centrifugal pump are now kept in stock in Madras in large numbers and of a considerable variety of sizes, so that it is possible to get delivery of a pumping plant in a few days The practical importance of this can hardly be overestimated and where there is little to choose between the productions of rival makers. those on the spot are almost certain to secure the preference. It would certainly be desirable to have a greater variety of engines and pumps to select from, but it is not merely necessary for would-be competitors in the market for engines and pumps to secure a recognition of the suitability of their machinery, they must also have it on the spot and ready for delivery at very short notice.

21. As was reported last year the Madras Corporation have adopted Hornsby oil-engines to drive the centrifugal pumps in several of their sewage pumping stations. The engines have worked very well and a considerable saving in the fuel bill was effected; but it was generally recognized that there was no perceptible improvement in the pumping. As it was proposed to replace the oil-engines by new steam plants, I volunteered to investigate the matter and with the consent of Government the work was started early this year. After a preliminary survey of the sewage system, the Venturi meter belonging to the pumping department was placed in the main leading from the DeMellos Road pumps and it was then discovered that the chief defect was in the pumps being unable to discharge the sewage gas which accumulated in them. Ventilating pipes were fitted to the pumps and a very marked improvement in the discharge took place. A report has been submitted to the President of the Corporation recommending the lowering of the level at which the pumps are fixed wherever possible so as to reduce the length of suction and suggesting that in future all centrifugal pumps should have horizontal fans and should be placed at the bottom of the pumps. This will enable suction valves to be dispensed with and will entirely eliminate the troubles due to the evolution of the sewage gas in the suction pipes; the pumps will run in solid water and their efficiency will be much greater than at present.

22. Recently a consideration of the methods of utilizing the water in the sandy beds of rivers led to the discovery that the commonly accepted idea that there is a slow flow of water through the sand is quite erroneous. The minimum hydraulic gradient at which water will flow through sand is much greater than the slope of the river beds and any movement of the water below the surface of the sand is therefore impossible. The most important result following from this conclusion is that it is now possible, by determining the hydraulic gradient at which water ceases to move in any river bed, to demarcate the area from which existing spring channels, wells or intercepting galleries draw their water-supply. This will enable us to put down pumping plant in the future with a certain knowledge as to the effect it will have upon the water in the river bed and will enable us to predict with a fair degree of accuracy the volume of water which can be obtained after visible flow in the river has ceased. It also follows that since there is no movement of water in the sand the quantity actually available is much less than was generally supposed to be the case. This question will be dealt with in full detail in the scientific report, which is now under preparation, in which also the various technical questions briefly referred to, will be discussed in greater detail.

23. Appendix III is a statement of the accounts for the year. The total expenditure on the department amounted to Rs. 14,105-4-7, but it is only possible to estimate approximately the value of the work done as the expenditure only in part defrayed by the funds placed in my hands. Roughly it amounted to slightly over half a lakh of rupees and there is work in progress which will be shortly completed at an additional cost of a quarter of a lakh of rupees.

A. CHATTERTON,
Director of Industrial and Technical Inquiries.

ENCLOSURE I.

In the following notes details are given of the results obtained at some of the pumping stations which were described in last year's report—*vide* pages 37—41.

Melrosapuram.—The engine and pump worked on 157 days for 958 hours at a total cost, including interest and depreciation on capital outlay, of Rs. 660 equivalent to annas 11 per hour. The quantity of water raised was on an average 1,861 cubic feet per hour and the lift 23·14 feet. 3,900 cubic feet were lifted, one foot for one anna. The rainfall was 51·79 inches, the area under the pump was 20·10 acres and 97,600 cubic feet of water were supplied to the sugarcane plantation which was ordinarily dependent on the Canadian aermotor. In all, therefore, 1,686,000 cubic feet of water were supplied to 20·10 acres equal to an average of 1·92 feet per acre. Owing to defective cultivation the value of the produce per acre amounted to only Rs. 86, whilst the cost of the water-supply was nearly Rs. 33 per acre.

Kadiampatti.—This installation worked very unsatisfactorily during the year owing to the defective supply of water in April, May and June and the excessive rainfall in August which materially damaged the crops. 1,510,100 cubic feet of water were raised an average height of 21 feet at a total cost of Rs. 493-11-0 equivalent to 4,013 cubic feet raised one foot for one anna. Careful accounts were kept of the distribution of water to the several crops, but the yield from the land was so poor that the information which has been recorded is of no practical value.

Villupuram.—The engine and pump were worked for 1,432 hours and raised 6,000,000 cubic feet of water an average height of 13·33 feet. The working expenses amounted to Rs. 1,050 and interest and depreciation at 12½ per cent. on a capital outlay of Rs. 4,000 to Rs. 500 making the total cost Rs. 1,550. This works out to 3,230 cubic feet lifted one foot for one anna. This installation was worked by Messrs Parry & Co., and the high cost is due to very high rates paid for liquid fuel and to the inclusion in the accounts of the total cost of the establishment maintained at this pumping station. The water-supply is excellent and the ryots in the neighbourhood are extremely anxious that it should be kept permanently at work and have offered to pay Rs. 15 per acre for dry crops and Rs. 20 per acre for wet crops on the termination of the present agreement with Messrs. Parry & Co. The land round the well is very porous and it will probably be necessary to make an impervious channel for about ½ a mile to carry the water to soil better suited for irrigation.

Katalai.—The total capital expenditure on this installation is about Rs. 14,000 so that interest and depreciation amount to Rs. 1,750 per annum. During 1906-1907 the pump was only worked for 153 hours and the working expenses were Rs. 440. The land commanded by this pump is 300 acres but permission to take water in the hot weather has been restricted to an area of 60 acres. The lands are usually watered by a channel from the Amarávati river and last year the supply was exceptionally good and assistance from the pump was not required. Fifty-five acres of plantains were cultivated and watered after the channel ran dry. The plantains were sold at annas 12 per bunch and yielded not less than Rs. 600 per acre which is a fancy price. Ordinarily the plantains may be calculated to yield a gross return of Rs. 200 to Rs. 250 per acre. This installation has proved very profitable and demonstrates in a remarkable way the high value which may be assigned to a certain and perennial water-supply. Many other installations would be set up on the Cauvery if the terms upon which water can be drawn from the river were made sufficiently favourable. The leading channel from the pump which cost Rs. 1,500 and had only just been completed was washed away by a high flood in November. The engine and pump worked satisfactorily and the owner required no assistance from us.

Nellikuppam.—From the accounts furnished by the owner the following abstract has been prepared. Total area under cultivation 19·61 acres, value of produce Rs. 2,571 as shown in the following table—

					Rs.
Plantains,	...	5·65	acres yielded crop worth	...	1,500
Ragi,	...	1·56	„ „	...	36
Kumbu,	...	5·42	„ „	...	214
Paddy,	...	6·98	„ „	...	821
		19·61			2,571

The working expenses of engine and pump were Rs. 289, interest and depreciation Rs. 300, cultivation expenses Rs. 1,023, total Rs. 1,612, leaving a net profit of Rs. 959 or Rs. 49 per acre. The engine and pump and the water-supply are capable of irrigating a much larger area of land and consequently neither are anything like fully utilized. In the cane-crushing season the engine drives a sugar mill and is kept fully employed. The success of this plant has induced a number of people in this part of the country to invest in oil engines and pumps, a plentiful water-supply being usually procurable within 20 feet of the ground level.

Cuddalore.—The engine and pump were run 3,533 hours and lifted about 2,500 cubic feet per hour a vertical height of 27 feet. The working expenses were Rs. 1,189 and interest and depreciation may be estimated at Rs 400, making the total charges Rs. 1,589. 9,370 cubic feet were lifted one foot for one anna. This fairly favourable result is due to the fact that the plant was steadily at work for 9 months of the year. The water-supply is sub-artesian in character and though the flow is less than when the borings were first made it is now fairly constant. 46·25 acres were under cultivation and yielded a gross income of Rs. 2,698-3-3, whilst the total expenditure including pumping charges amounted to Rs. 3,069. This disappointing result was entirely due to the failure of the sugarcane crop, from 10 acres of which only Rs. 275 was realized. Mr. Panduranga Mudaliyar is however sinking another well about a quarter of a mile from the existing well with a view to extending the area under cultivation to 90 acres. With increasing agricultural experience this enterprising vakil will probably obtain better results.

Saidapet.—From the accounts furnished by the Acting Principal it appears that the engine was run on 203 days for 2,103 hours and lifted 4,965,000 cubic feet of water an average height of 22·5 feet. The total cost of working including interest and depreciation was Rs. 842-13-9 which means that 8,300 cubic feet were lifted one foot for one anna. In addition to watering the Botanical Gardens, 6·9 acres in area, attached to the Agricultural College, 34·65 acres of crop were grown. The cultivation expenses amounted to Rs. 880 and the receipts from sale produce to Rs. 1,416. Commercial considerations did not influence the choice of crops cultivated; otherwise the returns would have been much larger. The water registers were kept with great care and accurate information obtained as to the distribution of water to the different crops. From the data thus obtained diagrams of water-supply including rainfall have been prepared which will be discussed in detail in the report on the duty of water.

Bezwada.—The pump lifts water from Ryves' Canal in the Kistna Delta system and was worked for 1,213 hours, raising 1,920 cubic feet per hour on an average lift of 19½ feet at a total cost of Rs. 850. This is equivalent to 3,340 cubic feet raised one foot for one anna. The farm land is very sandy and there was a very heavy loss of water through seepage from the distribution channels with the result that the duty of water on the land was very low.

Enclosure II.

The majority of the pumping plants erected recently possess no features of an unusual character and need not be referred to in detail but the installations at Surapet erected for Mr. Gopinath Tawker, on the Godavari lankas for Messrs. Innes & Co., of Cocanada, and at the Hagari experimental farm merit a brief description.

Surapet.—At the outset a 6½ h.p. engine and a 4″ pump were erected early last year to lift water from a small pond close to the Kortaliyar river. The pump delivered about 3,000 cubic feet per hour and the percolation into the pond was sufficient to keep the engine at work for about 5 hours a day. Under the pump 28 acres of plantains were planted and have done very well and will undoubtedly yield a good return on the capital outlay. Whilst the work in connection with the above plant was going on I was informed that some years ago the village people had bored a hole with a long jumper at the bottom of a well near the village from which water and sand gushed forth and fearing that the well would be damaged they had plugged it up as soon as possible. In September, to test the truth of this statement a 3-inch borehole was put down and, at a depth of 40 feet from the surface of the ground, sub-artesian water was struck which filled the well to within 13 feet of the ground level. To avail himself of this water-supply Mr. Tawker agreed to sink a new well and provide a 12 H.P. engine and 6″ pump. The well was made 12 feet in diameter and sunk about 24 feet, and from the bottom four 7 inch pipes were put down till the water bearing sand was reached. The pipes have not proved very satisfactory as they choke with sand and at the present time only two of them deliver water but the quantity yielded is sufficient to keep the pumping plant at work and 40 acres of sugarcane have been put down. Borings have been made by the Special Deputy Collector which revealed a very extensive area of water bearing sand and plans and estimates are now being prepared for raising water from a number of wells to irrigate an area of 300 acres. It is intended to put down a suction gas producer and gas engine as the source of motive power and to distribute it electrically to the pumps in the several wells. For various reasons it is necessary to proceed with the work cautiously to avoid incurring loss, the principal trouble being the lack of experience on the part of the cultivators with the valuable crops which it is now possible to grow.

Godavari lankas.—As is well known, the lankas on the Gódávari river below the anicut yield valuable crops of tobacco, which is sown at the end of the flood season and cut in February. When the local rains fail, it is necessary to water the crop and this is done at great expense by hand labour, the coolies having to carry the water up from the river in chatties and water each individual plant. Naturally this is very expensive and as the crop never gets sufficient water, the returns from tobacco cultivation vary greatly with the character of the season. Messrs. Innes & Co. of Cocanada, having acquired a long lease of a lanka belonging to the Vizianagaram Samasthanam, consulted me as to the possibility of using oil engines and pumps for raising water from the river to water the tobacco. After inspecting the lanka, I considered that it would be quite practicable to lift the water from the river-bed but that it was not quite certain that at the end of the season there would not be too much salt in the water as the lanka was situated within the tidal limits. Eventually Messrs Innes & Co. obtained a lease of a Government lanka much higher up the river and decided to instal four oil engines and pumps, two on the lower lanka, and two on the upper, where there was absolutely no question about the water-supply remaining fresh throughout the year. The main stream of the river runs close to the Eastern or left bank and the lankas form the opposite bank, gradually sloping up from the deep river-bed and subject to erosion or accretion during every flood season. On this side it would be quite impossible to establish pumping stations at any reasonable outlay and in all probability they would be washed away by the first high flood but on the western side of the lankas there is a deep narrow channel known as the Togaru Paya which has in most places almost vertical banks and is subject to very slight changes from year to year. Judging from the size of the trees on the banks and the testimony of the villagers there is no doubt that this channel has remained unaffected by floods for a very long time and it was accordingly determined to erect two pumps on its banks. The lower one, intended to irrigate Chinta Lanka, the land on the western bank of the channel, is a 6″ centrifugal pump driven by a 16 h.p. engine and will deliver two cusecs on a lift of 25 feet. The pump is placed over a brick well sunk a short distance back from the bank and connected to the channel by a culvert made with 18″ earthenware pipes. The water is delivered into a channel carried in embankment which runs back into the gradually rising ground. A small 1″ centrifugal provides circulating water for the engine jackets. The upper pumping station on Tadapudi Lanka is similar in general arrangements but the pump is an 8″ centrifugal driven by a 24 h.p. engine and capable of lifting 3⅓ cusecs. The land in this case is situated between the Togaru Paya and the main stream and is of a rather rough uneven surface which necessitates carrying the water in a channel with several branches and over one deep depression a wooden trough supported on tressles made of palmyras has to be employed. On Tadapudi Lanka there is a large brick well originally made to obtain water for a small indigo factory and on this a 12 h.p. engine and a 4″ pump have been fitted. This has been at work all last season but the infiltration to the well is not sufficient to keep the pump fully at work and the engine can only be run continuously by reducing its speed so that the pump delivers about ⅔ of its full discharge. This is of course an inefficient way of working but it is convenient till steps can be taken to deepen the well and obtain a better flow of water. Similarly on the lower lanka opposite Chinta Lanka a well has been sunk and a 3″ pump and a 6½ h.p. oil engine erected. The inflow to the well has proved more than sufficient to keep the pump fully employed. During last cold weather the rainfall was very favourably distributed and good tobacco crops were obtained, which was fortunate as the bigger pumps on the Togaraya Paya were not ready to deliver water. It is mainly in dry seasons that they will be required but in nearly every season it is expected that the additional supply of water which can be given will materially enhance the value of the crop. Experiments have been in progress since the tobacco was cut to ascertain what crops can be grown during the hot weather relying entirely upon the pumps for water and good results have so far been obtained with gingelly and Bengal jute. The soil is very absorbent and the channels are at present unable to carry the water any distance. During the early floods it is hoped that pumping will be possible and that the channels can be luted with silt; but what will happen later on when the floods will top the lankas is quite uncertain. The engines and pumps may be submerged for a few days at a time and preparations have been made to meet this contingency but it is only in exceptionally high floods that the pumps at the wells will be drowned. The jute on the higher parts of the lankas will benefit from the floods as in the middle of June it was fully 5 feet high and capable of standing immersion.

Should these expensive experiments of Messrs. Innes & Co prove successful they open out quite a new future for lanka cultivation. In the lower lankas within the range of the tide wells may be relied upon to supply fresh water and even in the upper reaches of the river it is not improbable that pumping water from numerous wells will prove more convenient than raising the water direct from the Togaraya Paya. The submersion of the engines and pumps is bound to be a source of trouble and as the wells can be sunk in the highest parts of the lankas, they can there be protected from all but extraordinary floods. In the event of pumping proving profitable, obviously most of the difficulties due to the periodic flooding of the land will disappear if some electrical system of distributing power be adopted as the central generating station can be erected on the mainland of the Central Delta and the power distributed by overhead wires. Electro-motors and small centrifugal pumps fixed in numerous wells will enable the lankas to be irrigated with less waste of water than a smaller number of pumping stations of much larger capacity and in flood time it will only be necessary to place the electro-motors in a dry place beyond the reach of the floods.

ENCLOSURE III

Cost of establishment from 1st April 1906 to 31st March 1907.

Designation.	Salary.	Travelling allowance.	Total.
	RS. A. P.	RS. A. P.	RS. A. P.
Supervisors	8,957 6 8	2,715 12 0	11,673 2 8
Sub-Overseer	210 0 0	33 0 0	243 0 0
Peons	192 0 0	188 7 6	380 7 6
Driver at Kadiampatti	140 0 0	....	140 0 0
Total ..	9,499 6 8	2,937 3 6	12,436 10 2
Contingencies.			
Supplies and Services—			
Wages		122 13 5	..
Materials		450 3 9	..
Tools and plant		818 3 0	1,391 4 2
Ordinary contingencies.			
Purchase of books		6 6 0	
Telegram		50 12 0	..
Postage		0 2 0	..
Tour charges		35 0 0	..
Office expenses		183 2 3	..
Miscellaneous		2 0 0	..
			277 6 3
		Grand Total ..	14,105 4 7

APPENDIX II.

REPORT OF THE WORK DONE IN THE GOVERNMENT BOTANIST'S OFFICE DURING THE YEAR 1906-1907.

Changes in the staff.—Mr. C. A. Barber, the Government Botanist, went home on the 19th January 1907 on privilege leave and furlough for 20 months. The Director of Agriculture then took charge of his duties. In the middle of February, Mr. Shepperson, Superintendent, Research Institute, and Principal of the Agricultural College, Coimbatore, was placed in charge of the Taliparamba farm. In May 1907, the Samalkota farm was placed under the charge of the Deputy Director of Agriculture, Northern Division, and soon after the close of the year under report the Palur farm was transferred to the charge of the Deputy Director of Agriculture, Southern Division. I took charge of the office shortly after the expiry of the official year.

Mr. N. Venkatakrishnama Nayudu, Assistant in Economic Botany, died on the 25th June 1906. No Economic Assistant was appointed till the 18th March 1907. The systematic Assistant was absent on leave on account of illness for about nine weeks at the commencement and about three weeks at the close of the year, and continues still unfit for duty.

Mr. P. N. Venkata Row, Assistant in Entomology, was suspended on the 3rd April 1906 on account of misconduct and his services were finally dispensed with. It was not till the end of July that the vacancy thus caused was filled up by the transfer of the Assistant to the Imperial Entomologist. The Entomological work of the office was thus practically in abeyance from April to August. Fieldman V. N. Rama Row was placed in charge of the sugarcane nursery at Melrosapuram on the 18th April. As he was found to be not up to the mark, he was sent back in October 1906 to the Collector's office, Chittoor, from which he had been taken. Fieldman Subramania Aiyar was made Agricultural Inspector in September and was placed in charge of the Palur farm, while Agricultural Inspector D. Balakrishnamurthi was relieved of the farm work and deputed to enquire about the sugarcane industry.

In April 1906, fieldman Subbiah was appointed and confirmed in the appointment after six months' probation. In March 1907 he was appointed Assistant Farm Manager and posted to Palur where he is now working.

The three appointments of fieldmen thus fell vacant during the year and the vacancies are not yet filled.

2. *Work of the office staff—Government Botanist.*—The Government Botanist was altogether 156 days on tour during the year. Samalkota was visited thrice, viz., in June, August and December, and the visits occupied 41 days altogether.

The second visit was made in company with the Director of Agriculture, the Imperial Agricultural Chemist, the Bengal Jute Expert, the Superintendent of Farms, the Agricultural Adviser to the Court of Wards, the Collector of Gódávari and the Chemists of the Deccan Factory, for selecting a site for a sugarcane nursery for the production of good seed cane for distribution to the ryots in the northern parts of the Presidency. Three reports were submitted on the subject of such a nursery. After the second visit to the Samalkota farm, the Government Botanist proceeded to the Government farm at Cuttack in company with the Jute Expert and the Reporter on Economic Products and observed the method of cultivating the crop and extracting fibre therefrom. A report on this inspection, another on the specimens of jute received from Ganjám and Vizagapatam and a third on the experiments conducted with jute at the Samalkota farm and lastly a report on the advisability of extending jute cultivation in the Gódávari district were submitted to the Board. The third visit to the Samalkota farm was made in company with the Director of Agriculture and the Imperial Entomologist.

Three visits were paid to the Taliparamba farm, viz., in April and October 1906 and in January 1907. The visits occupied on the whole 26 days. During the first visit all matters connected with the farm were gone through, all the plots were inspected and a scheme for the forthcoming year laid down. The second visit was made in company with the Director and Mr. R. C. Wood and the last in company with the Director and Mr. Shepperson.

The Palur farm was visited on five occasions which took 33 days in all. Two of the visits were made in company with the Director.

The Melrosapuram farm was visited in May and July.

Coimbatore was visited on five occasions. During the first visit, the site and plan of the Research Institute were discussed with the Director. The second visit was in company with Mr. R. C. Wood for selecting a site for a botanical garden. The third visit was for attending the ceremony of the foundation stone of the Institute and the College being laid. In October 100 mahogany plants were taken and established at the farm. The last visit was for meeting Mr. Shepperson.

Tanjore, Nidámangalam, Cuddalore and Tiruchengóde were visited on various occasions. The Nidámangalam trip was for inspecting the mango garden of Sir S. Subrahmania Iyer. Experiments were instituted for inducing the trees to fruit. The results of the experiments are to be watched for at least two seasons before any conclusions are drawn in regard to the results. A report on the inspection was submitted. Mr. Abraham Pandithar's garden at Tanjore, Mr. Pandurangam's sugarcane plantations and Messrs. Parry & Co.'s casuarina plantation at Cuddalore were visited, and the Kumaramangalam home farm near Tiruchengóde was inspected with Mr. Sampson.

3. The Government Botanist made contributions on the following subjects to the "Agricultural Journal of India":—

(1) The Samalkota Sugarcane farm.

(2) Early maturing canes.

(3) The Origin of New Sugarcanes by "Bud Variation".

He wrote also Bulletin No. 56 of the Madras Agricultural Department on the "varieties of cultivated pepper".

4. *Work of the Economic Assistant.*—The late Mr. Venkatakishnama Nayudu spent altogether 14 days on tour. He attended the Conjeevaram Agricultural show with a number of exhibits, viz., different varieties of sugarcane, groundnuts, fibres, etc.

5. *Work of the Systematic Assistant.*—The Systematic Assistant attended also to the duties of the Economic Assistant and to the general management of the office during Mr. Barber's tour. Owing to illness, he could not spend more than 27 days on tour. He identified grasses sent by several officers, and 2,000 plants of Mr. Barber's collection including all the host plants of Olax scandens, a root parasite of the prickly-pear, etc. In October, he explored the Nallamalais to find new kinds of haustoria, collected at Digunametta many root connections of Ximenia americana, discovered a new root parasite, viz, Opilia amentacea of the order of Olacinæ and made also a general botanical collection. The tour on the Nallamalais lasted about three weeks. The naming of the barks collected on the Anamalais, and of the grasses collected in South Canara was finished. He contributed notes on sundry botanical subjects to the Reporter on Economic Products, the Director of Agriculture, etc., and also assisted Professor Fyson of the Presidency College. While he was preparing for a tour in the Travancore forests he was attacked with malarious fever. The Director of the Botanical Survey of India inspected the botanical collections in the office on the 12th October 1906.

6. *New Assistant in Economic Botany.*—The new Assistant in economic botany who was appointed only about 12 days before the close of the official year attended to sundry botanical work in the office.

7. *Work of the Assistant in Mycology.*—The Mycological Assistant was studying in the beginning of the year herbarium and spirit specimens of the sugarcane fungus, accompanied the Government Botanist to Palur and conducted the necessary spraying operations for the *tikka*

disease in the ground-nut crop of the farm. In July, he investigated a disease which was rather confined to parts of the Amalapur taluk and of the Razole division of the Narsapur taluk and which was called "Lakka urugadam", literally "exudation of resin", the characteristic of the disease being a gummy exudation starting at the base and gradually extending upwards to nearly three-fourths of the trunk. A more extensive and serious disease which affected the palmyra and cocoanut palms and was characterised by the rotting of the bud or cabbage as it is called, has engaged his attention from October last. One Agricultural Inspector and eight Special Revenue Inspectors co-operated with him. The Imperial Mycologist inspected the diseased palms in March last and suggested that the operations for the eradication of the disease should be confined to a compact tract.

8. *Work of the Entomological Section.*—As said before, the entomological work of the office was in abeyance till August. Both the assistants were engaged till December in visiting the Government farms by turns for studying the crop pests.

The work at head-quarters consisted chiefly in sorting, arranging, labelling, and recording the old and the fast accumulating tour collections, according to the Imperial Entomologist's directions. Many insects collected locally were reared in the office for studying their life history. The collections of insect specimens have been divided according to the Imperial Entomologist's directions, into two classes, one the most important called the "E" or economic collection, and the other "G" or general collection. The former class comprises pests or useful insects and the other class consists of insects of general interest. All economic specimens are given serial numbers and recorded in an economic register and until they are identified, they go by their numbers as E-1, E-4, etc. Similar is the case with the "G" collection. All the reports and notes of observation, etc., of the pests are filed according to the numbers of the pests. The number of economic insects at present on record is about a hundred.

The system of submitting a report every month to the Imperial Entomologist on the work done by the Assistants has been introduced and the reports are being sent every month and received back with remarks from that officer. In addition to the monthly reports, special reports on any particular investigation are also sent to Pusa for the Imperial Entomologist's remarks. All the insects to be named are also sent in batches and three such batches were sent during the year and several insects got named. In short the work has been very much enlarged and the Provincial Entomological Assistants are in close touch with the Imperial Entomologist and are guided and supervised by the latter in everything.

The Imperial Entomologist visited Madras in December with the special object of discussing the work of the Entomological Assistants and the keeping of the collections. He spent a couple of days in giving all kinds of directions and drawing up a plan as regards their work, and the keeping of the collections. The Entomological work in the office is now carried on in accordance with the directions of that officer.

9. *First Assistant in Entomology.*—Mr. Ramakrishna Aiyar, the First Entomological Assistant, spent altogether 70 days on tour. He visited the Palur, Attur, Melrosapuram and Koilpatti farms to study the crop pests. The visit to the Palur farm was for the special purpose of studying the *Surul pest* in the groundnut crop. In March he was sent to investigate some insect pests which had seriously damaged the paddy crop in many parts of the Penukonda taluk. Specimens of the pests were sent to the Imperial Entomologist who identified one of the pests as "Schoenobius bipunctifer".

10. *Second Assistant in Entomology.*—Mr. Y. Ramachendra Row, the Second Assistant in Entomology, visited the Saidapet, Samalkota, Coimbatore and Hagari farms, and studied the crop pests which were numerous especially at the last. At the end of the year, he was at the Hagari farm. He spent altogether 89 days on tour.

11. *Fieldmen.*—Fieldman Subramania Aiyar was sent in April 1906 to inspect and report on a site for a sugarcane nursery at Melrosapuram. He visited the place several times subsequently. He was sent to Palur on three occasions and helped the Agricultural Inspector in laying out plots, etc. Till he was put in charge of the Palur farm as Agricultural Inspector in September, he had spent 27 days on tour.

Fieldman Subbiah was sent to Tinnevelly in June to attend the agricultural show with the Palur farm exhibits and to Samalkota in January 1907 to assist the Agricultural Inspector during the cane-crushing season. His tours extended over 44 days before he was posted as Assistant Farm Manager, Palur.

Fieldman V. N. Rama Rao was sent to Melrosapuram on two occasions to superintend the operations at the cane nursery and to settle the nursery accounts with the Pastor. He also visited the neighbouring villages of Chingleput, Conjeeveram and Merlosapuram to enquire about castor and margosa oil-cakes.

12. *Artist.*—The artist visited Samalkota twice and made paintings of sugarcane and fibre plants, and 24 paintings of moths and butterflies. He prepared sketches of ploughs, harrows, etc He drew sketches of the ground-nut crop affected with surul puchi, tikka disease and millipedes. He also drew several plans of buildings for the farms under the Government Botanist's charge as well as for other Government farms.

13. *The Library.*—The Librarian, who was working under the Government Botanist, was transferred to the Director's office in February 1907. During the year under report many botanical books and periodicals on Botany and Entomology, were added to the collection. The proposed system of cataloguing is not yet taken up on hand and a rough list is used by the librarian in taking out books, etc. A new scheme of distributing books, pamphlets, journals, etc., will be given effect to shortly.

CAMP PALUR,
12*th June* 1907.

C. K. SUBBA RAO,
Ag. Government Botanist.

APPENDIX III.

REPORT ON THE COLLEGE OF AGRICULTURE, SAIDAPET, FOR 1906-07.

I have the honour to submit the report on the College of Agriculture for the official year ended 31st March 1907.

2. I took charge of the office of Principal from Mr. Keess on 22nd January 1906, as stated in the report for 1905-06, and have held it since.

M.R.Rys. R. V. Subramania Aiyar, M. R. Ramaswami Sivan, J. Chelvaranga Raju and T. V. Narayana Rao continued to act during the year as second, third, fourth and fifth Assistants respectively.

The post of sixth assistant was held by M.R.Ry. T. Mohan Lal until the end of December, when his services, being no longer required, were dispensed with, as he was a temporary man.

From January M.R.Ry. R. V. Subramania Aiyar had no teaching work to do. He has now been deputed to survey and map the Central farm at Coimbatore and other agricultural stations—*vide* your Dis. No. 943, dated 12th April 1907. From the above it will be seen that the teaching staff consisted of six assistants including myself till the end of December and of four since.

3. At the commencement of the year there were two classes (II and III) with 31 students—class II, 19; class III, 12. Class III finished its course at the end of December, when only one class was left. Five stipendiary students of this class not having succeeded in passing in at least four out of the six preliminary subjects during the first two years' course became disentitled to stipends under College rule 6. Two of them left the College, while the other three continued their course as paying students. Thus the strength of this class (class III of the current session) was 17 on the 31st March.

Numerous applications from persons both in and out of the Presidency for prospectus and rules of the college continued to be received during the year under report.

	Class I.		Class II.		Class III.		Casuals.		Total.	
	31st March 1906.	31st March 1907.	31st March 1906.	31st March 1907.	31st March 1906.	31st March 1907.	31st March 1906.	31st March 1907.	31st March 1906.	31st March 1907.
1. Europeans and Eurasians	..	..	..	..	..	..	..	..	..	..
2. Native Christians	..	..	..	..	2	..	..	..	2	..
3. Muhammadans	..	..	1	..	2	1	1	..	4	1
4. Brahmans	..	..	7	..	6	5	..	1	13	6
5. Non-Brahman caste Hindus	..	..	11	..	1	9	..	1	12	10
6. Panchamas and kindred classes	..	..	..	..	..	..	..	..	..	..
Total	..	..	19	..	11	15	1	2	*31	17

* Includes one student who rejoined the college with a view to complete the Diploma.

Classification according to general educational qualifications—

Matriculates	8†
F.A's.	1
Non-Matriculates	8

† Two of these have also passed the Upper Secondary examination.

4. *Instruction.*—Instructions, both theoretical and practical, were given in accordance with the directions contained in G.O., No. 429, Educational, dated 24th July 1902, as in previous years.

April to December—Two classes.

Lectures—Class II.—Received lectures in Meteorology and Geology, General Chemistry, Anatomy and Physiology, and Agriculture.

Class III.—Lectures were delivered in Agriculture (including Entomology), Agricultural Chemistry and Veterinary Science and Hygiene.

Practical work—Class II.—The students had field classes regularly. They were also engaged in field cultivation. They raised on about 4½ acres cholum, dholl mixed with varagu, blackgram, greengram, etc., performing all the operations connected with the cultivation themselves. They had each also a fair share in the general work of the farm. As to Agricultural Engineering, they were taken to Guduvancheri to see irrigation works, to Chetput to see brickkilns and to Egmore to see the station buildings under construction. They were also solely employed twice, each time a week, in the preparation of engineering plans and estimates. In General Chemistry, the students had qualitative analyses to do. In Anatomy and Physiology, they had dissections and practical physiological demonstrations at the hospital.

Class III.—This class worked in the dairy and practised skimming milk by the cream separator, churning butter, etc. The students took part in the supervision of farm work under the guidance of the Bailiff and had practice in ploughing. They undertook their second tour of agricultural enquiry in the Coimbatore district—*vide* Board's Proceedings, Mis., No. 5217 dated 30th August 1906. M.R.Ry. J. Chelvaranga Raju, Acting Fourth Assistant, went in charge of the party. The tour lasted from 2nd to 26th September. The practical work in Agricultural Chemistry consisted of qualitative analyses of feeding stuffs and manurial substances. For practical instruction and work in Veterinary Science and Hygiene, they attended the hospital regularly and took part in dressing cases and in performing minor operations. By a special arrangement with the local butchers, rams were obtained from them for the students to practice castration. The animals after operation were returned to the butchers with a reward.

January to March—One class.

Lectures.—The class received lectures in the subjects of the third year's course, viz., Agriculture and Entomology, Agricultural Chemistry and Veterinary Science and Hygiene.

Practical work.—The students had field classes and dairy practice. They were also engaged in the extraction and preparation of different kinds of fibres. As in the previous years, practice in ploughing and in other farm operations will be given from July next. They undertook their first tour of agricultural enquiry from 7th to 26th January. The tour was made in the South Arcot, Tanjore, Trichinopoly and Madura districts, and M.R.Ry. T. V. Narayana Rao, Acting fifth Assistant, accompanied the students—*vide* Board's Proceedings, Mis. No. 7394, dated 13th December 1906. In Agricultural Chemistry they had laboratory work at quantitative analyses. Practical instruction and work in Veterinary Science and Hygiene were given at the hospital.

5. During the year under report, as in previous years, the demand for the services of passed students both in public and private service was in excess of the supply available. So far as my knowledge goes, no ex-student is without employment.

6. The students had regular exercises in gymnastics and physical drill.

7. The "Recreation Club" and the "Students' Agricultural Association" were maintained till the end of December. They had to be suspended during the current session on account of the paucity of the students and want of funds.

8. *Examinations.*—The results of the Government Technical examinations held in December are detailed in the subjoined statement. The results were on the whole satisfactory. They were particularly so in Agriculture, Veterinary Science and Hygiene and General Chemistry.

Students of class III, 12 in number, appeared for their final Diploma examinations. Four (two stipendiary and two paying) have qualified themselves for the diploma. Three have each passed in all the subjects, but one for the diploma.

Subject.	Candidates who appeared for first time.			Candidates who appeared after having previously failed.		
	Appeared.	Passed.	Percentage.	Appeared.	Passed.	Percentage.
Botany, Intermediate, Special	..	..	..	5	1	20·0
Meteorology and Geology, Intermediate, Special	17	8	47·0	3	2	66·7
General Chemistry, Intermediate, Special	*12	(*a*) 11	91·7	6	3	50·0
Anatomy and Physiology, Intermediate, Special	16	(*b*) 5	31·2	..	..	..
Veterinary Science and Hygiene, Intermediate, Special.	11	(*c*) 10	90·9	..	..	..
Surveying and Levelling, Intermediate, Special	..	..	..	†10	(*e*) 5	50·0
Agricultural Engineering, Intermediate, Special	‡17	9	52·9	3	2	66·7
Agriculture, Advanced	11	(*d*) 11	100·0	1	1	100·0
Agricultural Chemistry, Advanced	11	5	45·5	..	..	..

*Exclusive of two who did not appear.
‡Exclusive of one who did not appear.
†Exclusive of one who did not give his paper.
First-class—(*a*) 4; (*b*) 2; (*c*) 3; (*d*) 3; (*e*) 1.

9. R. R. Dongrey, a paying student from Central India, won the Clogstoun prize of the value of Rs. 45-6-2, for having secured the highest number of marks in the College examinations throughout the three years' course. The Robertson prize of the value of Rs. 87-4-6, which is awarded to the candidate who stands first in Agriculture advanced at the Government Technical examinations, was won by G. Jogi Raju, a stipendiary student from Gódávari. The same student was entitled to the guaranteed appointment of Rs. 40, which is conferred upon the candidate who secures the highest number of marks in the Diploma examinations, but he declined to take it up and has entered private service. With regard to the total number of marks, R. R. Dongrey was ranked second and K. Krishnamurthi Rao, a stipendiary from Cuddapah, third. The former would not take service in this Presidency. In these circumstances the appointment was conferred on K. Krishnamurthi Rao. He has been entertained on a salary of Rs. 40 per mensem in the grade of Assistant Managers of Agricultural Stations—*vide* B.P., Mis. No. 2200, dated 26th April 1907.

10. *Museum.*—Up to end of December M.R.Ry. T. V. Mohan Lal, acting sixth Assistant, was in charge, and during the rest of the year M.R.Ry. T. V. Narayana Rao, acting fifth Assistant. A few additions were made to the specimens and some of the old ones were replaced.

11. *Veterinary hospital.*—I continued to be the officer in charge and M.R.Ry. S. P. Swaminathan, the hospital-keeper. As reported in the report for 1905-06, the hospital-keeper has been, under the Proceedings of the Director of Public Instruction, Dis. No. 615, dated 5th February 1906, practically in sole charge of the hospital work, ever since I took charge of the office of Principal. Of course in difficult cases he seeks my advice. The manner in which he has managed the hospital is highly creditable to him and he has proved his fitness for independent charge of a Veterinary Hospital.

There was a fair increase in the number of cases. The increase has not been so steady and satisfactory since 1904 as it was in the years previous, and the number of patients has practically reached the maximum. It is, however, possible to increase the number of bovine patients, if cattle owned by poor people be housed, fed and treated at the hospital cost. Proposals about this were submitted to the Director of Public Instruction in 1904. The number of cases treated during the year are collated below with that of the previous year ;—

	1905-06	1906-07.
Horses	350	386
Cattle	551	557
Other animals	351	360
Total ...	1,252	1,303

There was a saving in the expenditure, which including "Establishment" was Rs. 1,686-5-9 as against Rs. 2,056-1-7 in 1905-06, and there was a substantial increase in the income, which was Rs. 969-9-5 in the year under report as against Rs. 837-15-1 in the previous year—*vide* appendix III

A separate report by M.R.Ry. S. P. Swaminathan is enclosed.

12. I beg in conclusion to acknowledge the services of the staff and officers of the College.

S. L. D'SILVA,
Ag. Vice-Principal.

21*st May* 1907.

APPENDIX I.

STATEMENT giving particulars called for in Proceedings of the Director of Public Instruction No. 10543 of 1898 (the occupation of parents added as in previous years).

Class.	Distribution of scholars according to wealth.			Occupation of parents.				
	Richer class.	Middle class.	Poorer class.	Officials.	Petty-officials.	Traders.	Land holders.	Others.
Class I	..	..	..	..	..	..	..	..
,, II	..	..	..	..	..	..	..	..
,, III	5	10	..	1	..	1	8	5
Casuals	..	2	..	.	..	..	1	1
Total ..	5	12	..	1	..	1	9	6

Average number on the rolls (1st April to 31st December 1906—two classes) .. .. .. 30·67
Average daily attendance .. .. 24·8
Average number on the rolls (1st January to 31st March 1907—one class) 17
Average daily attendance 12

Appendix II.

Statement showing the distribution of students according to districts.

Districts or provinces.	Class I.	Class II.	Class III.	Casuals.
1. Gódávari	..	..	1	..
2. North Arcot	..	..	1	..
3. Tanjore	..	..	1	2
4. Tinnevelly	..	..	1	..
5. Coimbatore	..	..	1	..
6. Salem	..	..	1	..
7. Malabar	..	..	2	..
8. Travancore	..	..	3	..
9. Indore State	..	..	1	..
10. Kathiawar	..	..	2	..
11. Punjab	..	..	1	..
Total ..	..	..	15	2

Appendix III.

Statement showing expenditure and income at Veterinary hospital.

	1905–1906.			1906–1907.		
Expenditure—	Rs.	A.	P.	Rs.	A.	P.
Establishment	859	8	0	876	0	0
Hospital charges	465	2	4	268	3	9
Medicines and instruments	279	9	7	388	14	1
Repairs to Veterinary hospital buildings ...	451	13	8	153	3	11
Total ...	2,056	1	7	1,686	5	9
Income—						
Subscriptions	16	0	0	24	0	0
Payment on account of stabling	191	7	10	283	1	1
Payment on account of advice and medicines.	538	12	0	577	6	7
Payment on account of sundry matters ...	91	11	3	85	1	9
Total ...	837	15	1	969	9	5

Appendix IV.

Number of books on 1st April 1906		2,394
Number of books added during 1906–1907		52
Total ...		2,446
Number of books lost and written off during 1906–1907		5
Number of books on 31st March 1907		2,441
Number of books taken by the staff		292
Number of books taken by students		370
Total ...		662

Appendix V.

Financial statement (including Accountant-General's adjustments received up to date).

No.	Items.	Budget estimate, 1906–1907.	Expenditure. 1905–1906.	Expenditure. 1906–1907.
			Rs. A. P.	Rs. A. P.
1	Principal and Vice-Principal	595	*12,498 1 6	902 9 3
2	Masters and teachers	8,916	8,675 5 1	8,811 0 0
3	Establishment	2,431	2,380 0 1	2,301 10 4
4	Travelling allowances	225	274 14 0	198 0 9
5	Veterinary Hospital establishment	877	859 8 0	876 0 0
6	*Supplies and services*—			
	Library allowance	100	134 1 0	5 12 0
	Prize allowance		75 0 0	..
	Scholarships	1,939	2,842 11 6	1,766 14 7
	Petty works of construction	..	237 14 0	..
	Laboratory charges	300	378 15 1	301 12 0
	Veterinary Hospital charges	2,104	465 2 4	268 3 9
	Repairs to Veterinary Hospital buildings		279 9 7	388 14 1
			451 13 8	153 3 11
	Furniture and *appliances* including Europe stores and purchase of livestock.	100	83 12 2	6 10 3
			2,126 5 1	
	Batta and carriage to Agricultural students	600	518 9 3	504 0 9
	Farm annexe	7,000	8,896 9 3	4,931 1 7
	Botanical garden	1,200	1,200 0 5	759 14 2
7	*Contingencies*—			
	Petty repairs to buildings	500	776 0 3	100 11 0
	Cleaning charges	43	45 12 5	39 9 9
	Rents, rates and taxes	165	172 12 0	164 8 0
	Repairs to furniture	50	17 6 0	2 4 0
	Tour charges	100	126 1 9	26 5 9
	Postage charges	90	87 5 6	60 0 6
	Telegraph charges	8	2 5 0	3 0 0
	Purchase of books	15	7 6 0	0 4 0
	Office expenses	462	530 5 9	409 5 2
	Total	27,820	41,737 12 0	22,592 13 6
			2,405 14 8	388 14 1
	Receipts—			
	Farm annexe	..	7,604 5 10	5,657 6 7
	College fees	..	466 0 0	336 0 0
	Rents and miscellaneous	..	252 10 7	201 1 11
	Veterinary Hospital	..	837 15 1	969 9 5
	Total	..	9,160 15 6	7,164 1 11

* Includes Rs. 735–3–0 being exchange compensation allowance.

Note.—The figures in clarendon are Accountant-General's adjustments.

Note.—In the revised estimate for 1906–1907, submitted with this office letter No. 139, dated 12th February 1907, amount of surrender under each of the several budget heads has been given.

Enclosure No. 1.

Letter—from M.R.Ry. S. P. Swaminathen, Hospital-keeper.
To—the Acting Vice-Principal, College of Agriculture.
Dated—Saidapet, the 29th April 1907.

I beg to submit my report on the working of the Veterinary hospital for the official year ending 31st March 1907.

During the year under report, I continued to be the Hospital-keeper. On your becoming Principal from 22nd January 1906, I was ordered to have charge of the hospital (*vide* Director of Public Instruction's Proceedings, Dis. No. 615, dated 5th February 1906) and it continued to be under my charge throughout the year 1906–1907.

The number of cases admitted rose from 1,252 (horses 350, cattle 551, other animals 351) in 1905–1906 to 1,503 (horses 386, cattle 557, other animals 360) in the year 1906–1907. There was thus, during the year under report, an increase of patients under each heading, which shows that this hospital has been as popular with cattle-owners as with the owners of horses and dogs. Among the bovine patients treated, there were 33 cases of epizootic aphtha, and of these 25 were calves that came from the King Institute of Preventive Medicine. All recovered and were discharged from the hospital as cured. Under the present circumstances of the hospital, it may be said that the number of cases has practically reached the maximum. I believe, however, that there is room for increasing its usefulness, if your proposals for enhancing the number of cattle patients are given effect to.

The receipts were Rs. 969–9–5 (subscription Rs. 24, stabling Rs. 283–1–1, advice and medicines Rs. 577–6–7, sundries Rs. 85–1–9) in 1906–1907 against Rs. 837–15–1 (subscription Rs. 16, stabling Rs. 191–7–10, advice and medicines Rs. 538–12–0, sundries Rs. 91–11–3) in the previous year. The income under "stabling" has increased by about 50 per cent. and the receipts under "advice and medicines" have also advanced. This is due to a larger number of horses being admitted and to a larger proportion of them being treated as in-patients at the hospital. I beg to note that the feeding charges do not go under receipts as, according to the rules, the hospital undertakes only treatment of in-patients and owners have to make their own arrangements for the feeding and attendance (other than medical) of their animals.

Both from a financial and professional point of view, the work of the year under report may be said to compare favourably with that of the previous years.

Four horses, four bulls and eighteen dogs were castrated during the year and all were discharged with not a single case of casualty. Four cases of canine and one case of bovine rabies were admitted into the hospital. All these cases of rabies were kept under close and careful observation until death.

As usual, the diseases treated were varied and the surgical practice was interesting.

I have the honour to submit the report on the farm and botanical garden for the year 1906–1907. A separate report on the farm by M.R.Ry. J. Chelvaranga Raju, acting fourth Assistant and Farm Manager, and another on the Botanical Garden by M.R.Ry. T. V. Narayana Rao, acting fifth Assistant and Officer in charge of the garden, are enclosed. I request that about 50 printed copies of the report be furnished to me as in the previous years for distribution to visitors and others applying for them.

2. During the year under report I continued to be in charge of the farm. As stated in the last year's report, the farm had been for sometime in the independent charge of the Vice-Principal, but, with the reversion to the Agricultural Department on 18th July 1904 of M.R.Ry. C. K. Subba Rao, Rao Bahadur, the last acting Vice-Principal, the charge of the farm devolved on the Principal. I succeeded to the charge on 22nd January 1906, when I assumed charge of the office of Principal.

3. M.R.Ry. J. Chelvaranga Raju continued to be the Farm Manager and M.R.Ry. V. S. Subramania Sastri to be the provisional Bailiff during the year. M.R.Ry. P. V. Somayazulu, an ex-student, was the acting assistant bailiff and second clerk until 30th June, when he reverted to his permanent appointment in the Guntúr Collectorate. The post has since been allowed to lie vacant. The absence of an Assistant Bailiff and second clerk made the difficult circumstances in which I had been placed still more difficult and the work of the Manager and Bailiff heavy.

4. *Season.*—The season was unfavourable. The rainfall amounted to 49·97 inches, which was quite average, but the fall was unseasonable and the distribution ununiform.

Hot weather (April and May).—There was no rain during the period. These months are usually dry.

South-west monsoon (June. to September).—In June the rainfall was insufficient, being 1·0 inch as against an average of 2·03 inches. Further, the fall was distributed over six days, and the usual preparatory operations for the sowing of hot-weather crops could not be undertaken. In July, there was the average fall of 4·84 inches, of which 3·70 inches fell in a day and permitted of land being ploughed and sown with fodder crops. In August, 3·91 inches fell as against an average of 5·03. In September, the rainfall amounted to 10·63 inches, which was double the average for the month. Paddy was drilled in dry lands in the early part of the month.

North-east monsoon (October to December).—The rainfall was very deficient in October and November. In October only 3·71 inches fell, while the average due was 11·45 inches, and in November the fall was 8·47 inches as against an average of 13·3 inches. The standing crops suffered severely. December was marked by an unusual fall of rain *i.e.*, 16·77 inches, while the average due for the month was only a third of this. These heavy rains, were very injurious to crops, specially to the Bombay paddies under experimental cultivation which were just then throwing out ear heads.

Dry weather (January to March).—In January the rainfall was a trace and in February *nil.* March had but one wet day with 0·45 inch. The fodder crops that were destroyed by the heavy rains in December were replaced by fresh sowings in January, but these again perished from drought.

5. *Crops and cropping.*—Information about the crops grown during the year is furnished in statements in Appendix III. Having regard to the approaching closure of the farm, the greater part of the arable land was placed under fodder crops and the area under other crops was restricted.

Further trials in the cultivation of the eight Bombay varieties of paddy selected by the Board for special trial were conducted during the year. The three usual modes of cultivation were adopted, viz., drilling dry, sowing sprouted seed broadcast in puddle and transplanting. The results are given in appendix III (*e*), (*f*) and (*g*). As in the previous years, the crops raised on

the dry system fared the worst, and M.R.Ry. J. Chelvaranga Raju thinks, and I agree with him, that this mode of cultivation is the least suitable to these paddies. The broadcast and transplanted crops also did not on the whole do well. The heavy rains in December harmed them considerably.

M.R.Ry J. Chelvaranga Raju draws attention in his report to a crop of banku paddy—No. 3, Appendix III (a)—which was sown out of season and which, in consequence, took over ten months to mature, while the usual age of the crop is only five months. The crop was sown in February and was regularly irrigated from the oil-engine. By July the crop attained a luxuriant growth, but there were no signs of earheads. The crop was pruned down with the exception of a small portion which was left uncut. The cut portion shot into fresh growth again and both the portions put forth earheads in September, and the crop was harvested in October. The yield was good. The cut portion yielded better, which is noteworthy.

The experiment referred to in the last year's report for comparing the results of transplanting paddy in single seedlings with those of transplanting in the usual way was again conducted during the year under report—*vide* Appendix III (*b*)—while in the previous year the yield of grain was in favour of "single planting", the results this year were practically the same in both methods. Even then in the case of "single planting" there was a saving in seed and labour. Further trials are desirable.

The effect of green manuring for paddy was compared with that of Messrs. Parry & Company's special paddy fertilizer. The green manure used was a crop of sunn-hemp, which is a leguminous plant, ploughed in. The paddy fertilizer was used in the same plot to which it had once been applied in the previous year. The comparison is in favour of green manuring. Full information is given in appendix III (i).

Uppam and Karunganni cotton crops that stood on 1st April continued to yield fairly well. The crops were removed during the year.

Caravonica cotton must be considered a failure. The plants were pruned in August, but the new shoots also became sickly and subject to insect pests.

The ratoon sugarcane crops that were standing on 1st April did not thrive well. The crops (4·6 acres) were sold by auction for Rs. 205.

The crop of plantains on 1·50 acres referred to in the last year's report continued to yield well. The proceeds during the year were Rs. 230. Half an acre more was planted during the year. This has not commenced to yield yet.

6. The oil-engine worked very steadily and satisfactorily. It needed very few repairs during the year. The total cost of working, including repairs and wages of driver, but excluding depreciation and interest, fell from Rs. 1,045-8-7 in 1905-1906 to Rs. 542-13-9 during the year under report, and the cost of lifting one acre inch one foot high from 8·2 pies to 3·4 pies—*vide* Appendix II (*a*).

7. *Stock.*—Cattle stock had been considerably reduced in the latter part of 1905-1906, but, during the year under report, only two bull calves were sold. The stock is capable of further reduction and steps are being taken to dispose of about 25 head. Sheep stock was thinned down by the sale of 62 head—*vide* appendix IV.

8. *Finance.*—Expenditure fell from Rs. 8,896-9-0 in 1905-1906 to Rs. 5,690-15-9 in 1906-1907 and the receipts from Rs. 7,066-10-10 to Rs. 5,657-6-7. The saving in expenditure was due to a variety and number of causes. In view of the impending closure of the farm all avoidable expenditure was avoided; the oil-engine cost less; and the reduction of the stock towards the close of 1905-1906 and the raising of fodder crops lead to the diminution of expenditure under cattle food. The fall in the receipts is only apparent but not real. The receipts of the year are the average of the past few years. Last year's income was swelled by the proceeds of sale of cattle, casuarina plantations and sugar-cane. The income from these sources during the year under report was comparatively little as will be seen from the following figures:—

	1905-1906.	1906-1907.
	Rs.	Rs.
Cattle	805	63
Wood	1,100	70
Sugar-cane	1,470	300 (ratoon)
Total ...	3,375	433

9. *Botanical garden.*—M.R.Ry. T. Mohan Lal, acting sixth Assistant, was in charge until the end of December, when his acting appointment at the College ceased. M.R.Ry. T. V. Narayana Rao, acting fifth Assistant, has been in charge since 1st January. He was also in charge from 1st to 27th April, during the absence of M.R.Ry. Mohan Lal on sick leave.

The cropping results of the year are not satisfactory. The unusual fall of about 7 inches of rain in a single day in September affected most of the crops while young, and the heavy rains in December damaged them again when they were advancing to maturity. The cabbages grown during the year did not form into globe heads like those in 1905–1906, nor did the crop of turmeric yield so abundantly as that grown in that year. Ratoon canes stood on about 22 cents on 1st April and 11 cents were planted during the year. Both the lots were sold in auction for Rs. 95.

The garden won a prize for the collection of sorghums exhibited at the flower show held in January last at the Agri-Horticultural Gardens, Teynampet.

10. I beg to bring to your notice the good work done by M.R.Ry. J. Chelvaranga Raju as Farm Manager and by M.R.Ry. T. V. Narayana Rao as officer in charge of the Botanical garden. M.R.Ry. V. S. Subramania Sastri rendered excellent service as Bailiff.

21*st May* 1907. S. L. D'SILVA.

ENCLOSURE No. 1.

Letter—from M.R.Ry. J. CHELVARANGA RAJU, Acting Fourth Assistant and Farm Manager.

To—the Principal, College of Agriculture, Saidapet.

Dated—Saidapet, the 8th May 1907.

I beg to submit the report on the working of the College Farm Saidapet, for the year 1906–1907.

The assistant bailiff's place was not filled up. This increased the work of the bailiff and manager a good deal although help was received in a way from other sources.

Season.—The rainfall registered at this farm during the year was 49·91 inches. Appendix I of this report shows the rainfall registered in each month compared with the fall in the same months during the previous year together with the average monthly rainfall of the last 36 years. During the first two months of the year—April and May—there was no rainfall. In June the rainfall was 1·09 inches; the average due being 2·03 inches. This was distributed over six days and consequently the usual preparatory tillage for the sowing of hot weather crops could not be undertaken. In July the fall was 4·84 inches, while the average due for the period was 3·98 inches. The rainfall was distributed over nine days and during the last week there was a fall of 3·70 inches in a single day. Advantage was taken of this rain in ploughing a good breadth of land for dry crops and in sowing some fodder crops. In August the fall was 3·91 inches, the average due for the period being 5·60 inches. This was distributed over ten days which was very favourable for sowing some area under dry crops and also for the crops that were sown in the previous month. In September the rainfall was 10·63 inches, while the average due was only 5 60 inches. This was distributed over ten days, the third week alone registering 9·11 inches, of which 6·97 inches were precipitated in a day. The moisture obtained in the last week of August coupled with the slight falls in the first two weeks of September facilitated the drilling of paddy in dry lands. In October the rainfall was only 3·71 inches, while the usual average for the period was 11·45 inches. In the first two weeks of October the weather was very dry and several of the young crops sown in the previous month showed symptons of withering. The rain registered was distributed over ten days in the last two weeks of the month. In November the fall was only 8·47 inches, while the average due for the period was 13·33 inches. This was distributed over 14 days and had it not been for this distribution, several acres of paddy would have completely withered. In December the rainfall was nearly one-third of the fall registered in the whole year, viz., 16·77 inches, the average due being only 5·9 inches. The fall was distributed over 13 days and there were several days in which rain was heavy. These heavy and untimely rains damaged a good area of the Bombay varieties of experimental paddy which was just then filling their ears, and also sunn hemp grown for fodder. In January there was rain only in one day and that was 0·4 inch, the average due being 0·57 inch. The area under fodder crops that was spoiled by excessive rains of the previous month was resown and the rainfall in January being below the average the crops were withering. In February there was no rainfall at all and consequently the crops were parched up. In March rain fell on one day to the extent of 0·45 inch.

Implements, machines, etc.—The ordinary implements of the farm were in constant use and the students were given enough practice in the working of bamboo drill, ploughing, etc. The over head bullock power chaff cutter was put in order and the same was utilised in chaffing fodder for the live stock. The winnowing machine was also locally repaired and was in use. The oil engine is in good order and has been working very satisfactorily. Some of the data connected with the oil engine as will be of general interest are given in Appendices II (*a*) and II (*b*). A new chrome tanned bucket was purchased from the School of Arts and it has been in constant use in one of the wells of the farm and has not needed any repair till now.

Manures.—About 210 tons of farm yard manure (from loose boxes, cattle byres and sheep pens) were collected during the year. No special manures were purchased. Messrs. Parry & Co.'s, special paddy fertiliser which was in stock from last years purchase was tried in the same plot in which the manure was tried last year and the results are noted in Appendix III (*i*). Sunn-hemp was grown for green manure in paddy lands and was ploughed in before transplanting paddy. The results in several cases were satisfactory.

Crops.—The total area of land cropped during the year on the farm and on the cemetery lands temporarily handed over to the farm by the Madras Corporation was 143·19 acres. Out of this four acres were cultivated by students. The remaining 139·19 acres include double crops and crops that stood throughout the year. In cropping the farm during the year the instructions of the Principal to contract the area under crops other than fodder crops and to increase the area under fodder crops was strictly adhered to.

Appendix III contains statements regarding crops grown during the year.

(*a*) Particulars of grain crops grown.

(*b*) do. fodder crops.

(*c*) do. miscellaneous crops.

(*d*) Particulars of crops grown and ploughed in for green manure and crops abandoned owing to failure of timely rains, etc.

(*e*) Particulars of Bombay varieties of paddy grown under drill system.

(*f*) Particulars of Bombay varieties of paddy sprouted and sown broadcast under puddle.

(*g*) Particulars of Bombay varieties of paddy that were tried under transplantation method.

(*h*) Particulars of experiments regarding single planting *vs.* ordinary planting of paddy.

(*i*) Particulars of the results of green manuring *vs.* Messrs. Parry & Co.'s, special paddy fertilisers.

Grain crops.—This occupied 40·23 acres and comprised 23·08 acres of paddy, 5·70 acres of ragi, 5·30 acres of cholam, 3·75 acres of varagu and 2·40 acres of sunn hemp for seeds. Of the 23·08 acres of paddy, 8·40 acres were grown with Bombay varieties of paddy, 2·35 acres with chinna samba, 4·89 acres with sirumoni and 7·44 acres with sixty days' paddy.

The Bombay varieties of paddy grown for experimental purposes were tried in three different ways, viz., drilled dry, sprouted and sown broadcast in puddle and transplanted from nursery. The drilled paddy under dry system has shared the same fate as in previous years in not yielding well and any attempt to grow these varieties dry in localities and soils of this nature will in my opinion end in failure. Appendix III (*e*) shows results

The sprouted varieties which were shown under puddle have not yielded well owing to the heavy rainfall in December when the ears were forming and Appendix III (*f*) shows details.

The transplanted experiments were conducted in field Nos. 10, 12 and 14 (*b*) (under the influence of oil-engine) in ¼ acre and ½ acre blocks. Four varieties were grown in No. 10 in ½ acre blocks and four varieties were grown in Nos. 12 and 14 (*b*) in not less than ½ an acre blocks. The fields were treated alike and the crop in the early stages was affected with disease reported in paragraph 17 of last year's report. The ½ acre blocks were affected the most. This coupled with the heavy rainfall in December damaged the crops to a great extent. Appendix III (*g*) shows details.

I would direct attention to serial No. 3 in Appendix III (*a*). The crop is Banku, one of the Bombay varieties of paddy, which usually matures in less than five months. When this was sown in February (not the season for cropping the ordinary varieties of paddy) the crop did not put forth ear heads in three months. Consequently the area was divided into two blocks—one was cut and the other was left to grow. The cut block began to throw fresh growth and about September ear heads were produced. In the uncut block also ear heads were formed at this time, but the yield was not as much as from the cut block. From the above facts it is clear that a variety of paddy if not sown in the proper season will take a much longer time to mature than the usual period of growth. This might probably account for the same variety of paddy having different duration of growth in two adjoining districts.

The experiment of single planting *vs.* ordinary planting of paddy was continued this year and both the blocks yielded almost the same results. Appendix III (*h*) shows details. Messrs. Parry & Co.'s special paddy fertiliser, was also tried in the same block of land in which the manure was applied last year. Side by side another field was grown with sunn hemp and the same was ploughed in as green manure to compare results with the above. The former plot in the early stages of growth was far better than the latter, but at the time of harvest the green manured block looked better in ear heads. Full details of the results are given in Appendix III (*i*). The remaining crops referred to in Appendices III (*a*), (*b*), (*c*) and (*d*) do not call for special remarks.

Livestock.—Appendix IV shows the number of stock at the commencement and end of the year. Two bull calves were sold during the year and one heifer died while under treatment at the veterinary hospital. The sheep stock was reduced a good deal. Ten rams, 25 old ewes and 27 lambs were sold during the year. There were eight deaths amongst sheep. One ewe died of old age, a gimmer of dysentery and six lambs of diarrhœa. Appendix V shows the yield of milk from the farm cows during the official year. Appendix VI shows in regard to the cows of the farm, the yield of milk between the last and previous calving in order to indicate the milking capacity under normal conditions.

Distribution of seeds, implements, etc.—Several applications were received from various parts of the Presidency for sunn hemp, Bombay varieties of paddy, sixty days' samba, American cotton seeds, guinea grass tufts, cholam and other seeds of crops raised in the farm and were complied with. Some varieties of plantain suckers were sent to Telaprole estate. Trained coolies of the farm and ploughs with and without cattle were also lent to those who wanted them in the vicinity of the farm. Implements and other agricultural products were sent to several agricultural exhibitions held in the Presidency. Improved ploughs of the Saidapet pattern were manufactured, whenever the farm smith could spare time, and supplied to several who wanted them.

Finance.—Appendix VIII shows the receipts and expenses of the farm. The farm proper excluding the botanical gardens has worked at a profit this year. This is chiefly due to the fact that the farm managed to raise its own fodder crops and also to the fact that much money was not spent in extra labour in cleaning the farm.

Appendix I.

RAINFALL statement for 1906–1907.

Month.	1905–1906.			1906–1907.			Average for the last 36 years.
	Total collected.	Rainy days.	* Wet days.	Total collected.	Rainy days.	* Wet days.	
April 1906	1·22	..	2	..	..	..	0·39
May ,,	..	..	..	..	..	..	1·65
June ,,	0·73	5	2	1·09	3	3	2·03
July ,,	1·40	7	3	4·84	4	5	3·98
August ,,	2·42	3	6	3·91	3	7	5·03
September ,,	7·03	..	5	10·63	4	10	5·60
October ,,	20·66	3	12	3·71	5	5	11·45
November ,,	9·48	7	12	8·47	3	11	13·33
December ,,	0·22	1	1	16·77	4	9	5·93
January 1907	4·73	..	3	0·04	1	..	0·57
February ,,	0·70	..	2	..	..	..	0·44
March ,,	0·10	1	..	0·45	..	1	0·24
Total ..	48·69	27	48	49·91	27	51	50·64

* A wet day is one in which more than 10 cents of rain are collected.

Appendix II (a).

DATA connected with the oil-engine and pump at Saidapet Farm during the year 1906–1907

Number of days pump worked in the year	... ...	203 days.
Do. of hours do.	... ...	2,103·33 hours.
Average time each day do.	... ...	10·36 hours.
Total number of gallons of oil including liquid fuel consumed during the period—		
Liquid fuel	... ... 1,260 gallons	1,308 gallons.
Kerosine oil	... ... 48 ,,	
Consumption of oil per working hour	... ...	0·62 gallons.
Total cost of oil and liquid fuel during the period—		
Liquid fuel	... ... Rs. 178–8–0	Rs. 193–8–8
Kerosine oil	... ... ,, 15–0–0	
Cost of oil per working hour	... ...	0–1–5·6
Average height of water lifted by pump during the period	...	22·43 feet
Minimum height of water do.	...	20·00 ,,
Maximum height of water do.	...	27·95 ,,

Total quantity of water	31,018,667 gallons.
Average number of gallons lifted per day	152,801·3 gallons.
Do. do. per hour	14,747·4 do.
Total cost of working the engine and pump including repairs, wages of driver, etc., but excluding depreciation and interest.	Rs. 542–13–9
Cost of working do. do.	0–4–1·5
do. of lifting 31,018,667 gallons or 1,367·2 acre inches to an average height of 22·43 feet	Rs. 542–13–9
Cost of lifting one acre inch to a height of 22·43 feet ...	0–6–4·2
Do. do. do. of 1 foot ...	0–0–3·4
Area of land (including double crops) under the influence of oil-engine in the Farm excluding 6·9 acres of B. gardens ...	34·65 acres.
Area of lands under the influence of oil-engine in the Farm excluding 6·9 acres of B. gardens	17·75 acres.
Total number of acres irrigated once during the year by engine and pump excluding water used for cocoanuts in the road, manure pit, etc.	571·570 acres.

Appendix II (b).

STATEMENT showing the details of expenses for oil-engine during 1906–1907.

Month.	Liquid fuel.		Castor oil.	Cylinder oil.	Kerosine oil.			
					Engine.		Lamp.	
	Quantity in gallons.	Value.			Quantity in gallons.	Value.	Quantity in gallons.	Value
1	2	3	4	5	6	7	8	9
		Rs. A.	Rs. A. P.	Rs. A.		Rs. A.		Rs. A.
April 1906	..	..	1 2 0	..	..	..	..	..
May ,, ...	120	17 0	4 8 0	13 0	..	..	8	3 6
June ,, ...	120	17 0	1 13 6	..	..	..	4	1 11
July ,, ...	240	34 0	3 12 0	13 0	48	15 0	8	3 6
August ,, ...	120	17 0	2 10 0	..	..	..	4	1 10
September ,, ...	120	17 0	0 10 0	..	..	..	..	..
October ,, ...	*Nil.*	..	2 5 6	13 0	..	..	4	1 10
November ,, ...	120	17 0	2 8 0	..	..	..	..	..
December ,, ...	120	17 0	..	..	..	..	..	..
January 1907	*Nil.*	..	2 10 3	..	..	..	4	1 10
February ,, ...	120	17 0	1 14 0	13 0	..	..	4	1 10
March ,, ...	180	25 8	5 0 0	13 0	..	..	8	3 4
Total ..	1,260	178 8	28 13 3	65 0	48	15 0	44	18 3

Month.	Asbestos.	Wages.	Repairs.	Contingencies.	Emery.	Soap.	Cotton waste.	Matches, etc.	Total.
	10	11	12	13	14	15	16	17	18
	Rs. A.	Rs. A. P.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A. P.	Rs. A. P.
April 1906	..	15 0 0	..	..	..	..	..	0 0 3	16 2 3
May ,, ...	..	15 0 0	..	0 3	..	..	1 4	..	54 5 0
June ,, ...	..	15 0 0	2 8	..	..	..	..	0 1 3	38 1 9
July ,, ...	..	15 0 0	..	0 4	..	0 4	..	..	84 10 0
August ,, ...	..	15 0 0	1 4	0 1	..	..	..	..	37 9 0
September ,, ...	..	14 8 3	..	0 2	..	..	..	..	32 4 3
October ,, ...	..	15 0 0	* 42 12	0 1	..	..	..	..	74 12 6
November ,, ...	..	14 0 6	..	..	..	0 2	..	..	39 6 6
December ,, ...	5 12	15 0 0	..	..	..	0 2	..	..	32 2 0
January 1907	..	15 0 0	10 4	0 1	0 8	..	0 8	..	30 9 3
February ,, ...	..	13 8 6	..	..	..	..	..	..	47 0 6
March ,, ...	..	9 1 9	..	0 1	..	..	..	..	55 14 9
Total ..	5 12	171 3 0	56 12	0 13	0 8	0 8	1 12	0 1 6	542 13 9

* Belting.

Appendix III (a).

CROPPING statement—Grain crops.

Serial number.	Field number.	Area.	Name of crop.	Date of sowing.	Date of harvest.	Yield.				Remarks.
						Grains.		Straw.		
						Amount.	Per acre.	Amount.	Per acre.	
				Paddy—Bombay varieties.						
		ACS.				LB.	LB.	LB.	LB.	
1	10	1·20	Bombay varieties.	10th October 1906.	2nd January 1907.	1,104·00	920.0	2,560·0	2,133·0	One acre was grown with experimental paddy,—appendix IV (*g*) gives details; the rest with mixed paddy. Crop was affected with disease.
2	12	1·77	Do.	8th October 1906.	Do.	1,361·25	769·0	3,192·0	1,804·0	Four varieties were grown for experimental purposes; appendix III (*g*) shows details. Crop was affected with disease.
3	12	0·60	Banko ..	2nd February 1906.	24th October 1906.	1,515·00	2,525·0	2,400·0	4,000·0	Standing on 1st April 1906. The crop was sown out of season. As the crop did not produce ear heads till July, the rank growth was cut, with the exception of a small portion of the crop and 10,920 lbs. of green fodder were obtained and the crop was allowed to grow. Both the portions produced ear-heads and in October 1906, the crop was harvested. The cut portion yielded better.
4	14 (*a*)	0·25	Do. ..	1st June 1906.	31st October 1906.	710·00	2,840·0	1,000·0	4,000·0	
5	14 (*b*)	0·42	Do. ..	3rd July 1906.	1st November 1906.	1,408·00	3,362·0	1,680·0	4,000·0	
6	14 (*b*)	0·33	Halwa gudiya.	8th October 1906.	31st December 1906.	85·00	260·6	224·0	678·7	Grown for experiment and is included in appendix III (*g*). The crop was affected with disease very badly.
7	16	1·06	Bombay varieties.	6th September 1906.	11th January 1907.	206·25	194·5	755·0	712·0	Sown dry with drill—appendix III (*e*) shows details.
8	21	0·36	Bombay mixed.	29th October 1906.	19th February 1907.	270·00	750·0	612·0	1,700·0	
9	21	0·64	Bombay varieties.	Do.	5th February 1907.	605·00	945·0	1,285·0	2,007·8	Sown sprouted in puddle—appendix III (*f*) shows details.
10	22	0·68	Do.	Do.	5th February 1907 and 15th February 1907.	870·40	1,280·0	2,410·0	3,544·0	
11	22	0·09	Dadkani ..	Do.	15th February 1907.	115·20	1,280·0	279·0	3,100·0	
12	26	0·50	Zina Columbia.	5th September 1906.	10th January 1907.	63·75	127·5	392·0	784·0	Sown dry with drill.
13	28	0·50	Bombay varieties.	29th October 1906.	11th February 1907.	140·00	280·0	280·0	560·0	Sown sprouted broad cast in dry land.
				Paddy—Chinna Samba.						
14	19	1·10	Chinna samba.	9th October 1906.	30th January 1907.	2,255·00	2,050·0	4,510·0	4,100·0	Transplanted.
15	26	1·25	Do.	4th September 1906.	4th February 1907.	825·00	660·0	1,650·0	1,320·0	Sown dry with drill.
				Paddy—Sirumany.						
16	14 (*b*)	0·42	Sirumany.	2nd November 1906.	1st March 1907.	387·50	923·0	630·0	1,500·0	The crop was affected with disease.
17	20	0·415	Do.	21st October 1906.	20th February 1907.	1,141·25	2,750·0	1,245·0	3,000·0	These are experimental blocks where single planting *versus* ordinary planting was tried—appendix III (*h*) gives full details.
18	20	0·415	Do.	Do.	Do.	1,150·00	2,770·0	1,245·0	3,000·0	

Cropping statement—Grain crops—*cont.*

Serial number.	Field number.	Area.	Name of crop.	Date of sowing.	Date of harvest.	Yield.				Remarks.
						Grain.		Straw.		
						Amount.	Per acre.	Amount.	Per acre.	
		ACS.				LB.	LB.	LB.	LB.	
Paddy—Sirumany—cont.										
19	20	0·41	Sirumany.	21st October 1906.	19th February 1907.	1,246·4	3,040·0	1,250·5	3,050·0	These are the blocks where green manuring *versus* Parry & Co's special fertilizers was tried—appendix III (*i*) shows full particulars.
20	20	0·43	Do.	21st October 1906.	19th February 1907.	1,130·9	2,630·0	1,032·0	2,400·0	
21	22	1·80	Do.	7th September 1906.	20th February 1907.	1,387·8	770·0	2,775·6	1,540·0	Sown dry with bamboo seed drill.
22	M.L 7	1·00	Do.	23rd October 1906.	26th February 1907.	1,790·0	1,790·0	2,500·0	2,500·0	
Paddy—Sixty Days' Samba.										
23	12	0·35	Sixty days' samba.	13th March 1906.	6th June 1906.	690·0	1,971·0	700·0	2,000·0	Standing crop on 1st April 1906.
24	12	0·30	Do.	18th June 1906.	22nd September 1906.	562·5	1,875·0	660·0	2,200·0	
25	12	0 95	Do.	23rd November 1906.	12th March 1907.	882·5	929·0	1,425·0	1,500·0	
26	12	1·50	Do.	16th January 1907.	..	..	..	..	..	Crop standing.
27	14(*a*)	1·00	Do.	9th February 1906.	2nd May 1906.	1,340·0	1,340·0	1,680·0	1,680·0	Standing crop on 1st April 1906.
28	14(*a*)	0·75	Do.	12th June 1906.	12th August 1906.	1,405 0	1,873·0	1,800·0	2,400·0	
29	14(*a*)	0·85	Do.	..	..	..	..	..	..	Crop standing.
30	14(*b*)	0·33	Do.	18th June 1906.	25th September 1906.	435·6	1,320·0	560·0	1,700·0	
31	14(*b*)	0·33	Do.	13th March 1906.	6th June 1906.	727·5	2,204·5	750·0	2,273·0	Standing crop on 1st April 1906.
32	14(*b*)	0·33	Do.	12th January 1907.	28th March 1907.	250·0	757·5	495 0	1,500·0	
33	M.L 7 (*a*)	0·75	Do.	5th December 1906.	19th March 1907.	900·0	1,200·0	1,500·0	2,000·0	
Ragi.										
34	3	2·50	Ragi ..	26th July 1906.	3rd October 1906.	1,876·0	750·4	6,496·0	2,598·4	
35	5	1·50	Do. ..	15th June 1906.	28th August 1906.	1,584·0	1,056·0	8,120·0	5,413·0	
36	10	1·20	Do. ..	8th June 1906.	28th August 1906.	1,391·5	1,159·5	4,312·0	3,593·0	
37	11	0·50	Do. ..	21st July 1906.	28th September 1906.	704·0	1,408·0	2,240·0	4,480·0	This was grown amongst young plantain tree in the interspaces.
Cholum.										
38	23	1·30	Cholum ..	31st October 1906.	8th March 1907.	148·2	114·0	4,251·0	3,270·0	The crop was at first intended for fodder but was subsequently allowed to seed.
39	28	4·00	Do. ..	22nd August 1906 and 28th September 1906.	18th January 1907.	464·0	116·0	15,456·0	3,864·0	Do. do.
Varagu.										
40	15	0·50	Varagu ..	17th August 1906.	25th January 1907.	390·0	780·0	750·0	1,500·0	
41	M.L 7 (*a*)	0·75	Do. ..	17th August 1906.	24th January 1907.	880·0	1,173·0	1,200·0	1,600·0	
42	8	2·50	Varagu and dholl.	4th August 1906.	21st January 1907 and 6th February 1907.	910 varagu 245 dholl.	364·0 98·0	4,480·0 ..	1,792·0 ..	Field is subject to trespass by cattle of slaughter-house.
Sunn hemp.										
43	19	1·10	Sunn hemp.	27th January 1906.	19th May 1906.	714	650·0	..	..	Standing crop on 1st April 1906. Stems did not realize any value.
44	23	1·30	Do.	29th January 1906.	14th May 1906.	309	238·0	..	..	Do. do.

Appendix III (b).

CROPPING statement—Fodder crops.

Serial number.	Field number.	Area.	Name of crop.	Date of sowing.	Date of harvest.	Yield.				Remarks.
						Green fodder.		Hay.		
						Quantity.	Per acre.	Quantity.	Per acre.	
					Cholam.					
		ACS.				LB.	LB.	LB.	LB.	
1	2	0·75	Cholam ..	1st August 1906.	12th January 1907.	..	..	1,932·0	2,576·0	Variety grown was black Irungu.
2	3	2·50	Do. ..	8th February 1907.	..	..	..	..	..	Crop standing.
3	4	1·00	Do. ..	23rd March 1906.	8th June 1906 to 9th August 1906.	7,056	7,056	..	..	Standing crop on 1st April 1906. Yield represents two cuttings. Variety is Irungu.
4	7	1 96	Do. ..	13th March 1906.	23rd May 1906.	14,056	7,171	..	..	Standing crop on 1st April 1906. Yield represents two cuttings.
5	12	1·80	Do. ..	17th May 1906.	3rd July 1906 to 6th October 1906.	25,256	14,031	..	..	Yield represents two cuttings.
6	13	2·00	Do. ..	6th August 1906.	30th January 1907.	..	..	4,440	2,220	Crop was unirrigated.
7	27	1·60	Do. ..	4th August 1906.	18th January 1907.	..	..	5,656	3,535	Do.
8	M.L. 8	4·00	Do. ..	22nd August 1906.	23rd January 1907.	..	..	8,400	2,100	Do.
					Guinea Grass.					
9	4	1·00	Guinea grass.	31st August 1906.	18th January 1907.	2,184	2,184	..	..	Crop is still yielding. Yield represents two cuttings.
10	5	1·50	Do.	16th November 1906.	16th February 1907.	7,196	4,797	..	..	Crop is still yielding. Yield represents three cuttings.
11	6	1·60	Do.	25th November 1905.	26th April 1906 to 30th March 1907.	44,744	27,965	..	..	Standing crop on 1st April 1906. Crop is still yielding. Yield represents 8 cuttings obtained during the year.
12	7	1·96	Do.	22nd August 1906.	11th October 1906 to 31st March 1907.	5,656	2,886	..	..	Crop standing. Yield represents three cuttings.
					Horsegram.					
13	1	7·00	Horsegram.	23rd January 1906.	25th April 1906.	17,696	2,528	..	..	Rainfall of 4·73 inches betwee 16th and 18th January 190 was utilized in sowing this crop. During its growth the rainfall was only 0·80 inch.
14	M. L.	7·50	Do.	31st July 1906.	4th October 1906.	6,776	935	..	..	Soil is pure sand. The crop was subject to trespass of cattle during nights.
					Sunn Hemp.					
15	25	5·00	Sunn hemp.	3rd August 1906.	1st October 1906.	..	..	5,992	1,198·4	Soil is pure sand. The crop was subject to trespass of cattle during nights.
					Lucerne.					
16	5	0·09	Lucerne ..	22nd November 1905.	11th June 1906.	125	1,389	..	..	Standing crop on 1st April 1906. Yield represents two cuttings and excludes last year's— Inoculated. Uninoculated. Bed .. 31 lbs. 37 lbs. Ridge .. 24½ ,, 32½ ,,

Appendix III (c).

CROPPING statement—Miscellaneous (Industrial and Garden crops).

Serial number.	Field number.	Area.	Name of crop.	Date of sowing.	Date of harvest.	Yield. Quanitity. In lb.	Yield. Quanitity. Per acre in lb.	Remarks.
		ACS.			*Groundnut.*			
1	3	1·00	Groundnut.	6th August 1906.	..	..	..	Crop was to a great extent damaged by crows, jackals and wild pigs. A portion was harvested, but the yield was very poor.
					Cotton.			
2	3	0·48	Uppam cotton.	2nd December 1905.	20th April 1906 to 23rd July 1906.	176	387·5	Standing crop on 1st April 1906. Yield is good.
3	5	0·21	Caravonica cotton.	23rd November 1905.	..	..	..	Standing crop on 1st April 1906. Crop still stands in the field. Growth is poor and the plants were affected with stem borer and boll-worms. The plants were pruned in August and the new shoots were also affected.
					Sugarcane.			
4	9	1·30	Sugarcane.	10th March 1905.	..	..	..	Ratoon crop that was standing on 1st April 1906. The value realized in auction was Rs. 55.
5	16	1·30	Do.	Do.	..	..	..	Ratoon crop that was standing on 1st April 1906. The value realized in auction was Rs. 55.
6	18	2·00	Do.	Do.	..	..	..	Ratoon crop that was standing on 1st April 1906. The value realized in auction was Rs. 95.
					Plantain.			
7	11	1·50	Plantain.	10th August 1904.	..	..	..	Standing crop on 1st April 1906. The yield during the year was Rs. 230–13–2; crop standing.
8	11	0·50	Do.	27th June 1906.	..	..	..	Crop standing; has not commenced to yield yet.

Appendix III (d).

CROPPING statement—Green Manure and abandoned crops.

Serial number.	Field number.	Area.	Name of crop.	Date of sowing.	Remarks.
1	16	0·53	Banko paddy ..	26th October 1906 ..	Crop failed as there was not enough of water in the Mylapore tank upon which it depended for irrigation.
2	(*b*) 14	0·42	Bangaru paddy	27th February 1906.	Standing crop on 1st April 1906. The variety was an introduced one from Bellary; it failed.
3	1	7·00	Horsegram	16th July 1906. ..	Ploughed in as green manure on 17th September 1906.
4	17	2·34	Do.	5th July 1906 ..	Crop was poor and was grazed by cattle.
5	1	7·00	Sunn hemp	3rd December 1906.	Crop failed owing to heavy rain in the early stage of growth. Nearly 16·77 inches of rain fell during the first month of its sowing.
6	1	7·00	Do.	3rd January 1907 ..	Crop failed entirely as there was no rain after sowing.
7	16	1·95	Do.	8th January 1907 ..	Do. do.
8	25	5·00	Do.	4th January 1907 ..	Do. do.
9	M.L.	6·00	Do.	4th December 1906..	Crop failed owing to heavy rain after sowing.
10	16	1·95	Do. and Indigo.	5th August 1906 ..	Crop was ploughed in as green manure.
11	20	1·70	Sunn hemp	4th August 1906 ..	Crop was ploughed in as green manure for paddy on 5th October 1906.
12	26	1·00	Do. and Horsegram.	8th September 1906.	Crop was ploughed in as green manure for paddy on 11th December 1906.
13	M.L.	6·00	Sunn hemp	17th July 1906 ..	Crop was ploughed in as green manure for paddy on 20th October 1906.
14	M.L.	1·50	Do.	25th August 1906 ..	Crop failed in consequence of attack of insect (caterpillars).
15	28	0·02	Cotton (Fyson's) ..	....	Standing crop on 1st April 1906. The crop was abandoned as it was not required by Mr. Fyson for whom it was grown.
16	2	4·00	....	....	The area was left for field cultivation by students. The crops grown were black gram, green gram, varagu, dholl, etc.

Appendix III (e).

STATEMENT showing the results of Bombay varieties of paddy sown dry by drill in 1906–1907.

Number.	Name of variety.	Date of sowing.	Date of harvest.	Quantity of seeds sown.	Area sown in acres.	Yield.			
						Grain.		Straw.	
						Amount.	Per acre.	Amount.	Per acre.
				LB.		LB.	LB.	LB.	LB.
2	Zina Columbia	6th Sept. 1906.	11th Jan. 1907.	$7\frac{3}{16}$	0·125	$38\frac{3}{4}$	310	160	1,280
5	Halwa gudiya	Do.	Do.	$7\frac{3}{16}$	0·125	$38\frac{3}{4}$	310	112	896
10	Sukhvel	Do.	Do.	$5\frac{5}{8}$	0·125	$18\frac{3}{4}$	150	56	448
14	Welchi (Surat)	Do.	Do.	$5\frac{6}{16}$	0·125	$21\frac{7}{8}$	175	56	448
17	Columbia	Do.	Do.	$5\frac{5}{16}$	0·125	$31\frac{1}{4}$	250	70	560
18	Dhadkhani	Do.	Do.	$5\frac{5}{8}$	0·125	$26\frac{7}{8}$	215	70	560
20	Chennur	Do.	Do.	$5\frac{15}{16}$	0·125	$17\frac{1}{2}$	140	119	952
22	Banku	Do.	Do.	$5\frac{5}{8}$	0·125	$12\frac{1}{2}$	100	112	896

Appendix III (f).

STATEMENT showing the results of the Bombay varieties of paddy sown sprouted broadcast under puddle in 1906–1907.

Number.	Name of variety.	Date of sowing.	Quantity of seeds sown.	Area sown in acres	Date of harvest.	Yield.			
						Grain.		Straw.	
						Amount.	Per acre.	Amount.	Per acre.
			LB.			LB.	LB.	LB.	LB.
2	Zina Columbia	29th Oct. 1906.	$6\frac{7}{8}$	0·16	5th Feb. 1907.	135	$843\frac{3}{4}$	345	$2,156\frac{1}{4}$
5	Halwa gudiya	Do.	$6\frac{7}{8}$	0·16	Do.	$112\frac{1}{2}$	$703\frac{1}{8}$	250	1,562
10	Sukhvel	Do.	$6\frac{7}{8}$	0·16	Do.	125	$781\frac{1}{4}$	330	$1,962\frac{1}{2}$
14	Welchi (Surat)	Do.	$6\frac{7}{8}$	0·16	1st Feb. 1907.	$232\frac{1}{2}$	$1,453\frac{1}{8}$	360	2,250
17	Columbia	Do.	$6\frac{7}{8}$	0·16	5th Feb. 1907.	170	$1,062\frac{1}{2}$	460	2,875
18	Dhadkhani	Do.	$6\frac{7}{8}$	0·16	15th Feb. 1907.	175	$1,093\frac{3}{4}$	550	$3,437\frac{1}{2}$
20	Chennur	Do.	$7\frac{1}{2}$	0·18	14th Feb. 1907.	280	$1,555\frac{5}{9}$	800	$4,444\frac{4}{9}$
22	Banku	Do.	$7\frac{1}{2}$	0·18	13th Feb. 1907.	245	$1,361\frac{1}{9}$	600	$3,333\frac{1}{3}$

Appendix III (g).

STATEMENT showing the results of the Bombay varieties of paddy transplanted in 1906–1907.

Number.	Name of variety.	Date of sowing in the nursery.	Area of nursery in acres.	Quantity of seeds sown in		Area transplanted.
				Madras Measures.	lb.	
1	2	3	4	5	6	7
2	Zina Columbia	10th September 1906.	·014	5	12½	·25
5	Halwa gudiya	Do.	·028	10	25	·60
10	Sukhvel	Do.	·014	5	12½	·25
14	Welchi (Surat)	Do.	·014	5	12½	·25
17	Columbia	Do.	·028	10	25	·50
18	Dadkhani	Do.	·014	5	12½	·25
20	Chinnore	Do.	·028	10	25	·50
22	Banku	Do.	·028	10	25	·50

Number.	Name of variety.	Date of transplantation.	Date of harvest.	Yield.			
				Grain.		Straw.	
				Amount.	Per acre.	Amount.	Per acre.
		8	9	10	11	12	13
				LB.	LB.	LB.	LB.
2	Zina Columbia	11th October 1906.	4th January 1907.	292½	1,170	560	2,240
5	Halwa gudiya	8th Do.	31st December 1906.	172½	287½	560	933⅓
10	Sukhvel	11th Do.	4th January 1907.	172½	690	520	2,080
14	Welchi (Surat)	11th Do.	4th Do.	240	960	540	2,160
17	Columbia	8th Do.	31st December 1906.	36¼	72½	504	1,008
18	Dadkhani	11th Do.	12th January 1907.	277½	1,110	660	2,640
20	Chinnore	8th Do.	2nd Do.	490	980	1,120	2,240
22	Banku	8th Do.	2nd Do.	422½	845	1,232	2,464

Appendix III (h).

STATEMENT showing the results of single planting and ordinary planting experiment in paddy.

Particulars.	Single planting.	Ordinary planting.
Area of field	·415 acre.	·415 acre.
Area of nursery bed	·015 acre.	·03 acre.
Quantity of seeds sown in nursery	¾ Madras measure.	7 Madras measures.
Number of bundles of seedlings obtained ...	100.	302.
Number of days seedlings remained in nursery.	40 days.	40 days.
	RS. A. P.	RS. A. P.
Labour engaged in transplanting	0 6 0	0 12 0
Do. weeding	0 4 0	0 4 0
Do. harvesting	0 6 0	0 9 0
Total ...	1 0 0	1 9 0
	LB.	LB.
Yield { Grain	1,141·25.	1,150.
Yield { Straw	1,245.	1,245.

N.B.—The field received similar treatment in every respect. Sunnhemp was grown for green manure and was ploughed into the soil. Each plot received 1½ tons of green manure.

Appendix III (i).

STATEMENT showing the results of green manuring *vs* Messrs. Parry & Co.'s paddy fertilizer.

Particulars.	Green manuring.	Messrs. Parry & Co.'s special fertilizer.
Area of field	·41 acre	·43 acre.
Nature of manure given ...	Sunnhemp was grown and was ploughed in (2 tons of green leaves).	Messrs. Parry & Co.'s special paddy fertilizer (182 lb.)
Date of transplanting ...	21st October 1906	21st October 1906.
Do. harvest	19th February 1907	19th February 1907.
Yield of grain	498 Madras measures or 1,245 lb.	452 Madras measures or 1,128 lb.
Do. straw	1250·5 lb.	1,032 lb.

N.B.—The other operations were performed alike to both plots.

Appendix IV.

STATEMNET showing the number of stock at the commencement and at the end of the year 1906–1907.

Description	Commencement of 1906-1907.	Additions during the year.			Disposal during the year.			End of the year 1906-1907.
		By birth.	By growth and conversion.	By purchase.	By growth or conversion.	By death.	By sale.	
Cows	16	..	..	..	..	..	..	16
Heifers	3	..	2	..	..	1	..	4
Heifer calves	12	5	..	..	2	..	..	15
Bulls	12	..	1	..	..	..	..	13
Bullocks	10	..	..	..	..	..	..	10
Bull calves	8	3	..	..	1	..	2	8
Total ..	61	8	3	..	3	1	2	66
Rams	10	..	1	..	..	..	10	1
Ewes	51	..	..	..	..	1	25	25
Gimmers	6	..	..	..	..	1	..	5
Lambs	35	33	..	..	1	6	27	34
Total ..	102	33	1	..	1	8	62	65

Appendix V.

STATEMENT showing the yield of milk by the College farm herd during 1906–1907.

No.	Names of cows.	Age.	Yield in 1906–1907.		Number of days cow yielded.	Average per day in	
			Madras measures of 100 cubic inches.	Pounds.		Madras measures of 100 cubic inches.	Pounds.
1	Kamala	10	652·62	2,447·32	241	2·70	10·01
2	Seetha II	11	614·00	2,302·50	217	2·83	10·61
3	Govindu II	8	632·25	2,370·94	238	2·66	9·96
4	Alamelu	12	278·12	1,042·95	249	1·12	4·18
5	Cousthabam	10	414·50	1,554·37	275	1·56	5·65
6	Lakshmi Bai	10	564·75	2,116·81	211	2·67	10·03
7	Meenakshi III	13	569·62	2,137·07	295	1·93	7·24
8	Meenakshi IV	8	599·12	2,242·70	251	2·38	8·95
9	Meenakshi V	6	540·87	2,028·26	318	1·70	6·38
10	Padmavati	10	544·50	2,041·87	350	2·18	8·16
11	Seetha III	6	394·75	1,482·31	238	1·65	6·27
12	Bagyam	9	1061·12	3,979·20	365	2·90	10·90
13	Mondothary	11	713·37	2,675·13	310	2·30	8·63
14	Kutti Kunju	12	748·75	2,807·81	330	2·27	8·52
15	Rama Bai	10	487·87	1,833·51	267	1·82	6·86
16	Duropadai	10	692·00	2,595·00	249	2·77	10·42
	Total ..	..	9,508·21	35,656·75	..	..	..

Appendix VI.

STATEMENT showing the yield of milk between the last and previous calving of the Saidapet farm herd in 1906–1907.

No.	Names of cows.	Interval between last and previous calving.	Number of days in the interval during which milk yielded.	Quantity of milk yielded during the interval between calving.		Average quantity per day during the whole interval.	
				Madras measures.	Pounds.	Madras measures	Pounds.
1	Kamala	454	304	939·50	3,523·12	2·06	7·76
2	Seetha II	427	276	774·25	2,903·43	1·81	6·79
3	Govindu II	377	250	551·87	2,068·51	1·57	5·49
4	Alamelu	369	351	1,002·00	3,757·50	2·72	10·12
5	Cousthabam	417	340	929·25	3,484·69	2·23	8·36
6	Lakshmi Bai	405	252	681·87	2,557·01	1·65	6·31
7	Meenakshi III	554	363	784·75	2,942·81	1·42	5·31
8	Meenakshi IV.	385	268	645·37	2,420·13	1·66	6·28
9	Padmavati	376	257	834·75	3,130·31	2·22	8·33
10	Baghyam	337	269	910·00	3,412·50	2·70	10·13
11	Mondothary	420	360	735·00	2,756·25	1·75	6·56
12	Kutti Kunju	522	342	813·50	3,050·52	1·55	5·84
13	Rama Bai	498	275	572·87	2,148·26	1·15	4·32
14	Duropadai	533	338	749·62	3,411·07	1·30	6·39

Appendix VII.

	RS.	A.	P
Value of services rendered by live-stock for the Botanical garden during 1906–1907.	257	4	0
Value of services rendered by live-stock on the farm during 1906–1907.	437	6	0
Value of labour to be charged against live-stock	420	0	0
Value of manure obtained, 210 tons at Rs. 3 per ton	630	0	0
Value of farm-grown fodder consumed by stock	892	9	0
Fees realised by bull service (200 outside cows and 16 farm cows).	100	0	0

Appendix VIII.

FINANCIAL statement of the College Farm for 1906–1907.

Receipts.				Charges.			
Particulars.	Amount.		Particulars.	Amount.			
	RS. A. P.	RS. A. P.		RS. A. P.	RS. A. P.
Field produce . Botanical gardens.	458 1 4		Botanical gardens	759 14 2	759 14 2
Field produce . College farm .	1,937 6 8	2,395 8 0	Cattle food . Ground-nut cake.	900 8 9	
			Cattle food . Gingelly cake ..	215 6 2	
			Cattle food . Dholl husk ..	387 11 3	
Live-stock. Sale of cows, calves and deahs.	229 3 3		Cattle food . Bran	1 0 0	
Live-stock. Sale of milk, butter, etc.	2,290 8 5		Cattle food . Rice	1 0 0	
Live-stock. Covering fees ..	100 0 0	2,619 11 8	Cattle food . Salt	11 0 0	1,516 10 2
			Live stock	51 14 0	51 14 0
			Manure	1 2 0	1 2 0
			Seeds and plants	14 1 7	14 1 7
Wood and miscellaneous ..	642 2 11	642 2 11	Labour	2,483 14 7	2,483 14 7
			Machines and implements ..	68 2 1	68 2 1
			Work shop	63 2 11	63 2 11
			Oil engine	542 13 9	542 13 9
			Estate improvements	73 0 0	73 0 0
			Contingencies	116 3 9	116 3 9
Total ..	5,657 6 7	5,657 6 7	Total ..	5,690 15 9	5,690 15 9

ENCLOSURE No. 2.

Letter—from M.R.Ry. T. V. NARAYANA RAO, Acting Fifth Assistant and Officer in charge of the Botanical Garden.
To—The Principal, College of Agriculture, Saidapet.
Dated—Saidapet, the 6th May 1907.

I beg to submit the report on the working of the Botanical Garden for the official year 1906–1907.

2. I held charge from the 1st of April to the 27th idem, when M.R.Ry. T. Mohan Lal, Acting Sixth Assistant of the College, who was on sick leave returned to duty and relieved me as officer in charge of the garden. When his acting appointment in the college ceased on 31st December 1906, he again handed over charge of the garden to me on the afternoon of that date.

3. The rainfall as registered in the garden was almost the same as last year, viz., 1905–1906, 47·98 inches; 1906–1907, 48·95 inches. Out of the 48·95 inches, 10·20 fell in September and 17·50 in December. The rain in September of which nearly seven inches fell on one day proved to be very injurious to seedlings of vegetables, etc., while the very unusual rain of 17·50 inches in December was detrimental to vegetable crops in general, some of which gave a very poor yield and others failed altogether.

4. Cattle dung and horse dung and castor cake to a very small extent formed the chief manures during the year. No further experiments were made with Messrs. Parry & Co.'s special manures.

5. The plots in the upper terrace were as usual utilised for the growth of specimen crops, the following being the chief groups:—

(1) Cereals.
(2) Pulses.
(3) Oil crops.
(4) Fibre crops.

There is nothing special to be mentioned with regard to any of these; almost all were affected by the heavy rains in December.

6. The following crops as specimens and for purposes of demonstration were also grown:—

Rhea, arrow root and sisal hemp.
English and country vegetables, turmeric, tobacco, lucerne, plantains, sugarcanes and soy beans.

The following were the vegetables grown:—

English.

(1) Goa beans.
(2) Kidney beans.
(3) Butter beans.
(4) Long beans.
(5) Celery.
(6) Tomatoes.
(7) Cabbage.
(8) Knol-khol.
(9) Carrot.
(10) Beetroot.
(11) Radish.
(12) Turnips.
(13) French beans.
(14) Peas.
(15) Lettuce cabbage.
(16) Vegetable marrow.

Country.

(*a*) Brinjals.
(*b*) Mango ginger.
(*c*) Snake gourds.
(*d*) Sword beans.
(*e*) Cow beans.
(*f*) Angular gourd.
(*g*) Tanjore and Poona chillies.
(*h*) Chillies (ordinary).
(*i*) Dioscorea.
(*j*) Telingana potato.
(*k*) Peas.
(*l*) Cucumbers.

As mentioned in paragraph 3 *supra* almost all the above suffered very much by the heavy rains in December as well as those in September. Compared with those of last year the cabbages of the present year presented a poor head and appearance. Tomatoes, knol-khol, French beans, peas, vegetable marrow, brinjals, snake gourds, angular gourds and cucumbers almost failed. All the others, except chillies which are still yielding, gave a very poor yield.

Turmeric also, compared with that of last year yielded a poor outturn. Tobacco was purely a specimen crop. Lucerne which was grown on a very small scale was sold green for horses.

Plantains.—The crop on 34 cents of land as mentioned in the last report as well as a few trees on the side of a water channel yielded Rs. 92 in all during the year, the amount having been realised from the sale of plantain fruits, plantains for curry, leaves, etc.

Sugarcanes.—The different varieties of Samalkot canes and a few others were grown on about 33 cents of land, about 22 of which being under ratoon. By the sale in auction, of the crop on the whole area, Rs 95 were realised.

7. Sugarcanes and a collection of sorghums were exhibited at the Flower show held in January last, at the Agri-Horticultural Society's Gardens, Teynampet. The collection of sorghums was awarded a prize.

II

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I

I have the honour to submit the annual report for the year 1906–1907, and I regret the delay which was unavoidable.

2. The subordinate staff of the Civil Veterinary Department remained the same as in last year. Three out of the four Veterinary Assistants who were on temporary employment were made permanent, and the other was allowed to resign his post at his own request.

3. The office establishment was strengthened by one clerk and a peon, and now that the work of the department has been considerably increased, as nine Veterinary Assistants have been recently entertained, it may be necessary to ask for a further augmentation.

4. During the year I was on combined privilege and furlough leave for six months and three days, between the months of May and November 1906 and Major Trydell was officiating during this period. Mr. Aitchison was appointed on probation and joined on the 30th April 1906 and it is hoped his services will be permanently retained in this Presidency.

5. I travelled for 48 days, and was at head-quarters during the remaining period. Opportunity was taken to inspect the Veterinary hospitals at Pithápuram and Bellary. I was present at the cattle shows held at Pithápuram, Ongole and Bobbili and Mr. Aitchison visited the one held at Ellore. I also supervised the work of the Veterinary Assistants. In March 1907 I paid a visit to the Taliparamba farm in connection with the question of starting cattle breeding. Major Trydell frequently inspected the Veterinary hospitals at Pithápuram, Madura and Trichinopoly and also visited Tinnevelly, Tiruvannámalai, Rájahmundry, Vizagapatam and Vellore for the purpose of selecting suitable sites for the Veterinary hospitals. A few other centres, viz., Ongole, Addanki and Coimbatore were inspected by Mr. Aitchison for the same purpose. The sites were selected and it is hoped that the constructions of buildings will soon be started. The latter officer had also inspected the Government stallions stationed in the Coimbatore district and attended to an outbreak of cattle disease in Wynaad taluk. He was also present at the Pithápuram and Ongole cattle shows.

6. Major Trydell also spent some time at Kodaikánal in selecting suitable sites for the Bacteriological Laboratory.

II.—Veterinary College.

7. There had been no changes in the staff of the College and the third lecturer has been nominated on a year's probation.

8. The final examinations of the students were held last year in December and the number of passes in each class was as follows :—

Class.	Examined.	Passed.	Percentage of passes.
A or 1st year	28	19	67·8
B or 2nd year	25	15	60·0
C or 3rd year	* 21	12	57·1

* Includes Swaminatha Aiyar of the Saidapet Veterinary hospital who failed to pass.

9. The Board of Examiners remarked that the results were fair, and I consider that the students, as a whole, had done creditably, considering that this was the first time that they were examined by the Board of Examiners, and that they were consequently somewhat nervous.

10. The total strength of the College at the end of March 1907 was 67, viz., class A-23, class B-25, and class C-19. Vacancies in class A were sufficiently advertised, and though more than 30 students were actually enrolled, most of them left the College subsequently, and in consequence of the low rate of pay, it seems rather difficult to obtain a good class of students. I have no doubt that the reduction in the initial pay has much to answer for failure to obtain the full complement of students, though the date of admission had been extended to the end of February 1907. The attendance in the classes, both at the practical and theoretical lectures, was fair except in the case of students who seemed uncertain whether they intended to undergo the course and who have since left the College. The final year students were given ample and repeated opportunities of performing operations on no less than 25 horses that had been sent to hospital for destruction. These horses were placed under the effects of chloroform and the operations were performed by the students under direct supervision and instruction of the lecturer

As many other operations as possible were performed by the students on Operative Surgery. The number of major and minor operations performed on hospital cases on the dead subject. 544 which was 17 in excess of that of the previous year operations as during the year was detailed below:—

	Major.	Minor.
Horses	116	76
Bovines	74	25
Other animals	186	67
Total ...	376	168

The major operations include the suturing of wounds, amputations of the tail, penis, horn and limbs, castration, trephining, tracheotomy, excision of tumours, removal of worm in the eye, neurectomy, setting of fractures and dislocations, etc., whilst the minor operations are those of opening abcesses, nail-cutting, paring of corns, seedy toe, bruised soles, rasping of irregular teeth, etc.

11. During the year the students were encouraged to play the various field games; but it is very necessary that there should be appointed a teacher of physical exercises, as the lecturers find their time too fully occupied with their lectures and hospital practice to be able to devote much time to the students in their play hours. Nevertheless, it is very essential that they should be encouraged to go in for as much physical exercise as possible.

12. The hostel contained on an average 18 students and it would be a good idea to give effect to the proposals made by Major Trydell, making it compulsory for each student to remain at the hostel. This has to be worked out, however, gradually.

III (*a*).—Cattle Disease.

13. During the year under review, the total loss of cattle from disease was 113,539 and from other causes 15,314 against 90,293 and 15,301 respectively, of the last year. The increase is particularly noticeable under "Rinderpest, Diarrhœa and Dysentery" and "unspecified diseases," the former contributing about 27·8 and the latter 47·3 per cent. of the total mortality. On the other hand, there was a decrease under "Anthrax", "Black quarter" and "Epizootic Aptha" which contributed only 10·6, 3·6 and 2 per cent., respectively.

14. The loss from rinderpest was heavy in Kistna, Kurnool, Guntúr and Nellore, and prompt steps were taken to check this outbreak by inoculating a large number of cattle in these districts. It is gratifying to observe that anthrax would seem to be steadily on the decline. There has been a very decided decrease in Tanjore, while Kistna still maintains its bad reputation having suffered the greatest loss (2,432). For want of adequate and reliable information, inoculation against anthrax has not yet been attempted in Kistna. Arrangements are now being made to investigate the matter with a view to apply preventive measures. It is, however, possible that the vast increase of mortality among cattle, as compared with the last year, is after all only apparent and not real, as it might be due to a more accurate record of deaths. The large percentage of deaths (47·3 per cent.) exhibited under "unspecified diseases" betrays some want of discrimination in the registration of mortality under proper headings but this is only to be expected where the information is of the vaguest. This state of things, it is regretted, cannot be helped as the expert assistance at our disposal is nothing like sufficient for the demands of the Presidency. Inoculation against rinderpest is being carried on in 12 districts and that against anthrax in only 7. 11·043 heads of cattle were inoculated against rinderpest and about 8·856 against anthrax. Of those inoculated, only a few were afterwards affected.

15. The total number of deaths among horses and ponies caused by diseases was 235, by snake-bites 11, and by wild animals 103. Criminal poisoning accounted for 43 deaths.

III (*b*).—Veterinary Hospitals.

16. There was no addition to the number of Veterinary hospitals during the year owing to there being no Veterinary Assistants available to be placed in charge of them. None of these hospitals are under the direct control of this department. It was proposed that the Saidapet Veterinary hospital attached to the Agricultural College may be placed under the direct supervision of the Superintendent, but final orders have not yet been received. The number of cases treated in each of these hospitals is shown in statement No. 5. More than 8,000 fresh cases were treated in all the five hospitals which give an average of 1,600 for each hospital or about 5 cases every day. It is observed that the hospital at Bellary has shown signs of progress more especially in the number of Bovine cases. In Trichinopoly, however, the daily attendance has shown a decline under each class but the number of in-patients has been fairly well maintained.

17. In Pithapuram though the hospital suffered to some extent on account of the change of Veterinary Assistants consequent on Abdullah, the permanent incumbent, proceeding to the Punjab, the total number of patients showed an increase over that of the previous year and more cattle were treated both as in-and out-patients.

18. The Saidapet hospital received, on the whole, 57 cases more than last year. The number of out-patients, excepting dog cases, reached the figures of last year, and in Bovine patients there was a slight increase. Among in-patients there were more cases of horses than cattle.

19. In Madura hospital, the number of fresh cases increased by 549 over that of the previous year, and it is reported that the total number of cases attended to was 22,200 as against 24,818 in the previous year. These figures represent the number of cases treated daily and would show an average daily attendance of 60. This shows that this institution has justified its existence and would indicate that similar institutions in other parts of the Presidency which are now in existence and those to be started hereafter have before them a large field of useful work. It will be necessary to offer treatment and advise free of charge until the popularity of these institutions is firmly established.

20. In the hospital attached to the Madras Veterinary College 2,249 cases were treated both under the heading of in-and out-patients. This gives an increase over the figures of the previous year by 36 cases.

21. The number of cases under equine patients was 955 as against 767 of the previous year. The number of Bovine patients suffered a decline by 10 cases. Every effort is made to increase cattle practice, as the students will have to deal more with this class of patients when they enter upon their work. There were many interesting cases among canine patients and, as a rule, it is found that students evince great interest in following the treatment of these cases.

22. It will be necessary to afford extended accommodation in the pharmacy as the present space is much too limited. The daily attendance has considerably risen and each section is under the charge of a lecturer.

23. Land has been purchased and plans submitted and it is expected that hospitals in Ongole, Rajahmundry, Vellore, Sivaganga, Tiruvannámalai and Coimbatore will soon be started.

24. The Pudukkótta and Vizianagram estates have recently started Veterinary dispensaries and obtained the loan of Veterinary Assistants. The District Board of Vizagapatam has also a dispensary of its own under the charge of one of the Veterinary Assistants of this department.

25. The total receipts of the Madras Veterinary College hospital amounted to Rs. 6,846-7-10 during the official year 1906-1907 as against Rs. 7,091-13-1 for the year previous.

IV (*a*).—Pony-breeding Operations.

26. At the commencement of the year 1st April 1906, there were 15 stallions on the rolls; "Tigris" having been ill for some time previously was brought to the Veterinary College hospital where he died in November. During the year no stallions were purchased. The stallions were stationed in Coimbatore, Salem and Madura districts. In Coimbatore there were 10 stallions at work. A stallion was stationed permanently in each of the taluks of Dharapuram, Erode, Kollegal, Coimbatore, Pollachi and Pallayakottai. There were two at Kangayam throughout the year. Of the remaining two, "Sheik" was working in Avanashi until the end of December 1906 and afterwards at Tiruppúr; "Turk" was at Avanashi for three months and at Karúr until the end of February and he was transferred again to Gobichettipalayam in March 1907. The total number of coverings was 218 in the Coimbatore district for 10 stallions as against 179 in the previous year. In the Salem district 4 stallions were at work. Three stallions, viz., "Selim", "Sunshine" and "Tigris" were stationed in the subdivision of Hosúr and the other was stationed at Tiruppattúr till the end of November 1906 and afterwards at Harúr. For all practical purposes "Tigris" may be excluded from our calculations as he was too ill to serve. In Hosúr division 2 were at Hosúr and one in Krishnagiri. The total number of coverings was 75 against 101 during last year.

27. In the Madura district there was one stallion as usual. He was located at Védasandúr till the end of June 1906 when he was transferred to Palni. He covered 22 mares as against 30 during last year.

28. On the whole, there were 315 coverings during the year against 310 in the one previous and the average was therefore 22 per stallion. The service of stallion "Sheik" was very poor, while he was at Avanashi and till December 1906, he covered only five mares. After his transfer to Tiruppúr in the early part of January 1907, his work improved a little. Similarly "Aly", "Ophir" and "Punch" had few mares brought to them. Stallion "Carbon" at Karúr covered only 7 mares during 12 months. It is reported that want of mares in season accounts generally for the small number brought to Government stallions. Nevertheless, the number of mares brought shows a slight increase, and this is encouraging, and when the Tiruppúr pony show again becomes an annual institution, we may look forward to increased interest among pony breeders. It is further hoped that, with the increase of Veterinary Assistants and Veterinary hospitals, the scope of pony-breeding operations may be extended to a few more centres. The prospect of keeping these operations under the direct supervision of Veterinary Assistants is calculated to end in better results.

29. *Results of coverings.*—The total number of coverings in 1905-1906 was 310 in the three districts of Coimbatore, Salem and Madura. The results were reported only in a very few cases viz., 65. Of these 8 were successful cases, 44 proved empty, 4 died and in 9 cases the whereabouts were not known. The Tahsildars concerned have been reminded to expedite the submission of the reports on the cases that have not been reported by them.

30. *Castration.*—The total number of entires castrated came up to 85 against 73 last year. The Salustri at Salem performed 53 operations and the other two in Coimbatore 35. A large number of bulls (294) were castrated in addition to the above and judging from the number, I consider that it is most encouraging, and would indicate that the ryots are now realizing the disadvantages of the indiscriminate service of cows by indifferent bulls. These men, in addition to the work of castration, supervised the grooming and feeding of Government stallions and administered to them medicines in common cases of illness. These duties will be undertaken by qualified Veterinary Assistants as the department developes.

IV (*b*).—Cattle Fairs and Shows.

31. During the year it was only possible to lend the services of a Veterinary Assistant to some of the cattle fairs held in the Tinnevelly district. There are 11 fairs in this district annually, each having a duration of nearly a month. He attended five fairs during which the Cattle Disease Act II of 1866 was enforced. About 80,316 cattle were brought in altogether for the purpose of sale at these shows, and it was reported that a large number of animals changed hands. There were no cases of prosecution under the Act and the cattle, with the exception of a few cases of foot and mouth disease, were generally free from contagious disease. These, when noticed, were treated carefully by the Veterinary Assistant. The method of inoculation was demonstrated to people at each of these shows, and its harmlessness explained. Cattle shows were also held in Madura, Kottacheruvu and Conjeeveram in conjunction with the Agricultural exhibitions held at the respective places. During the year four important cattle shows were held including the one at Ellore, Kistna district, which had been newly organised. Detailed reports regarding them have already been submitted to the Board of Revenue. The cattle shows held at Bobbili in the Vizagapatam district, Pittapur, and Ongole showed a decided improvement, and the exhibits of cows and heifers at Ongole and those of bullocks in Pittapur and buffaloes in Bobbili were remarkably good. The considerable interest shown by the members of the executive committees of the various associations no doubt tended to make these shows successful and this ultimately is beneficial to the ryot population. These shows have, however, been confined to the Northern districts, but there are indications that the members of the Southern district associations are bestirring themselves in the matter, and they should receive every encouragement. It is true that only certain parts of the Presidency have been identified as cattle breeding centres, but there is no reason why many other parts should not be suitable for a sufficient supply of cattle for their own needs without having recourse to purchase from cattle drivers.

32. At these shows it has been noticed that except in the Vizagapatam district very little attention has been paid to improve the breed of buffaloes. This is a matter for regret, and commercially a great mistake, and I have endeavoured to impress on the minds of the members of District Associations the necessity to pay some attention to this class of animals. There are vast areas of land in this Presidency which are eminently adapted to buffaloe breeding and rearing, and there are vast numbers of buffaloes but they are of a poor variety. In the Kistna district there are probably a greater number of buffaloes than cattle. If some influential body like the District Agricultural Association becomes interested, a great deal might be done to improve matters both in the way of breeding larger and more powerful he-buffaloes, and in breeding larger milk-yielding females. It is gratifying to note that some endeavour has been made to exhibit a better class of wool-bearing sheep, and if some further attention is paid to the colour of the fleece —it should be pure white —it would command a better market. There is a very useful field to be opened up here as wool always commands a fair price and there is always a market. There are a few points on which some improvement may be made, and these have been impressed upon the members of the various Agricultural Associations, whom the Member of the Board of Revenue has at various times addressed. No more bulls were purchased by Government during the year under review. There was one casualty among those purchased last year. The remaining six bulls kept good health. With the exception of two which are still rather young, the young bulls covered cows and they are much appreciated by the people.

V.—Veterinary Assistants.

33. All the six Veterinary Assistants were chiefly concerned with the prevention of cattle disease. Cattle in contact with those suffering from contagious diseases were inoculated as a preventive measure. The prophylactic treatment was carried in 13 districts of this Presidency and the subjoined table—

—	Malignant sore-throat.	Anthrax.	Rinderpest.	Total.
1904–1905	..	12,437	8,251	20,688
1905–1906	833	22,152	12,689	35,674
1906–1907	679	8,856	11,043	20,578

will show the number of cattle inoculated for each disease, and statement No III the number of cattle inoculated in each of the districts. In all these places the services of Veterinary Assistants were applied for and I am glad to be able to state that there has been no opposition,

except in a few villages where people have not yet shaken off their prejudices to the progress of inoculation work. On account of paucity of Veterinary Assistants, a considerable portion of time seems to have been spent in travelling from disease centre to centre, but when more Veterinary Assistants are available, this will not be necessary. On the whole, I consider that there was more confidence among cattle-owners and more co-operation on the part of the taluk officials, though the village authorities still try to shirk their attendance, when possible. This has been brought to my notice, and there is considerable truth in the statement that without the aid and help of these villagemen, but very little work can be done. The treatment by inoculation has afforded undoubted immunity in a great many cases, and if steps are taken to inoculate cattle on the first appearance of an outbreak, much harm will be surely averted. This has become of similar importance to that of vaccination in the case of human beings, and in course of time it will be accepted everywhere without the least opposition. On their tours Veterinary Assistants have also treated some surgical cases, such as cases of tumours and other cases of illness among cattle. In the immediate future I trust that the itinerating Veterinary Assistants posted to districts will be equipped with a few useful drugs and instruments, and which they will invariably carry about with them to attend to cases other than inoculation work. This will be a sure means of gaining the confidence of the ryot population. On this subject I have addressed the Board of Revenue already. People have very frequently made use of their services for the castration of their young stock as well as old animals. All these are included in the duties of a Veterinary Assistant, and when he is given charge of a single district, he will have more opportunities for helping the people in the treatment of their live-stock and offering advice on feeding, breeding, etc., generally. As it stands at present the Veterinary Assistant has no permanent head-quarters, as he is liable to be constantly transferred from district to district in accordance with urgent demands. These difficulties will disappear gradually as more Veterinary Assistants are employed. The greater portion of the time of one of the Senior Veterinary Assistants M. Hassan Aly Sahib has been devoted to the work of organising cattle shows and this he has performed very creditably.

34. The other Senior Veterinary Assistant V. P. Subrahmania Mudaliyar has done excellent inoculation work but some of his time was taken up with such duties as attendance at cattle fairs, inspection of stallions in times of illness, etc. He visited seven districts during the year, and inoculated 6,227 cattle against Anthrax, and 3,629 against Rinderpest, amounting to nearly one-half of the total number of inoculation performed by the remaining Veterinary Assistants. He also prepared a short paper on cattle breeding and rearing which was read at the cattle shows. He also translated it into Tamil for distribution.

35. A Veterinary Assistant was stationed in the Ganjám district for nearly the whole year, and in addition to attending to the inoculation of cattle he treated elephants belonging to the Agency. This latter duty occupied a considerable portion of his time somewhat to the detriment of his legitimate work. He inoculated 2,754 cattle.

36. The Veterinary Assistant at Gódávari S. A. Padmanabha Pillai was employed for the greater portion of the year in treating Government elephants, and for three months was in charge of the hospital at Pithapuram.

37. The other two Veterinary Assistants were employed on inoculation work and they inoculated 8,461 cattle.

38. During the year, cases of Charbon symptomatic were treated at the Remount Depôt, Hosur.

39. Veterinary Assistants have also inspected cattle pounds during their tours and any irregularities that were noticed were brought to the notice of the Tahsildars concerned. They also paid attention to the sanitation of the cattle sheds, and gave useful advice to cattle owners regarding their proper management, feeding, etc. Four of the Veterinary Assistants were on privilege leave for a month each. During the year the following doses of serum were received from the Imperial Bacteriologist under each sort:—

	Doses.
Rinderpest	19,000
Anthrax	7,000
Hæmorrhagic septicæmia	3,000

MADRAS,
10*th July* 1907.

W. D. GUNN,
Supt., Civil Veterinary Dept.

APPENDICES.

TABLE I.—Statement showing the main results of Veterinary colleges and schools during 1906–1907.

Veterinary colleges and schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the year.		Passed final examinations during the year.	Failed to pass final examination.	Remaining under instructions at the end of the year.				
		Scholarship holders.	Others.			In ordinary course.	Instruction prolonged by reason of failure to pass.	Matriculated with higher qualifications.	Knowing some English but not matriculated.	Knowing no English or very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary College, Madras.	..	10	Tution is given free.	12	9	60	7	16	7	..

Veterinary colleges and schools.	Receipts.			Expenditure.			Employment of students passed out during the three years preceding.				
	From fees.	From other sources.	Total.	Salaries of Instructing staff.	Stipends.	Total.	Total number passed.	In service of Government or Local Board.	In services of other bodies or institutions.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
Veterinary College, Madras.	..	..	..	RS. A. P. 6,281 1 0	RS. A. P. 3,381 1 7	RS. A. P. 9,662 2 7	12	..	..	..	..

TABLE II.—Statement showing the number of deaths (from diseases) amongst animals during the year 1906–1907.

Province.	Equines.					Bovines.						
	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest, diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter.	Epizootic aphtha.	Other diseases.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13
Madras ..	20	..	..	..	20	31,611	12,082	9,086	4,168	2,794	53,798	113,539

TABLE III.—Statement showing the results of preventive inoculation during the year 1906–1907.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Rinderpest.		
				Equines.	Bovines.	Others.
1	2	3	4	5	6	7
1. Ganjám	..	..	17	..	919	..
2. Gódávari	..	..	20	..	752	..
3. Kistna	..	..	198	..	3,944	..
4. Guntúr	..	..	36	..	2,324	..
5. Kurnool	..	..	6	..	783	..
6. Bellary	..	..	9	..	74	..
7. Anantapur	..	..	7	..	703	..
8. Nellore	..	..	5	..	337	..
9. Trichinopoly	..	..	1	..	39	..
10. Tanjore	..	..	34	..	1,025	..
11. Madura	..	..	33	..	..	..
12. Malabar	..	..	32	..	..	..
13. South Canara	..	..	6	..	143	..
Total ..	..	..	404	..	11,043	..

Districts.	Anthrax.			Hæmorrhagic septicæmia.		
	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
	8	9	10	11	12	13
1. Ganjám	..	1,840	..	..	..	..
2. Gódavari	..	122	..	..	..	..
3. Kistna	..	..	..	..	133	..
4. Guntúr	..	..	..	..	260	..
5. Kurnool	..	..	..	..	..	..
6. Bellary	..	815	..	..	191	..
7 Anantápur	..	..	..	..	..	..
8. Nellore	..	..	..	..	..	..
9. Trichinopoly	..	..	..	..	..	..
10. Tanjore	..	4,858	..	..	..	..
11. Madura	..	528	..	..	95	..
12. Malabar	..	641	..	..	..	..
13. South Canara	..	52	..	..	..	..
Total ..	..	8,856	..	..	679	..

TABLE IV.—Statement showing the number of animals treated and castrated by Veterinary Assistants and by salustries on tour during 1906–1907.

Province.	Number of villages visited.	Number of Veterinary Assistants employed.	Castration performed.				Treated for contagious diseases.	
			Equines.	Bovines.	Others.	Total.	Equines.	Bovines.
1	2	3	4	5	6	7	8	9
Madras (by Veterinary Assistants).	..	6	5	9	6	20	..	..
By salustries	..	3	85	294		379	..	..

Province.	Treated for contagious diseases—*cont.*		Treated for non-contagious diseases.				Total number of cases treated and castrations performed.
	Others.	Total.	Equines.	Bovines.	Others.	Total.	
	10	11	12	13	14	15	16
Madras (by Veterinary Assistants).	..	..	..	..	6	6	26
By salustries	..	..	..	..	..	..	379

TABLE V.—Statement showing the number of animals treated at Veterinary Hospitals during the year 1906–1907.

Province.	Number of Veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients. Remaining on 1st April 1906. Equines.	Bovines.	Others.	Admitted during the year. Equines.	Bovines.	Others.	Total. Equines.	Bovines.	Others.	Discharged during the year. Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pithapuram ..	1	1	..	..	..		22	1	9	22	1	8	21	1
Bellary	1	1	..	..	..	69	170	104	69	170	104	68	158	73
Madura	1	1	1	..	..	51	40	8	52	40	8	50	40	8
Trichinopoly ..	1	1	2	3	1	338	358	152	340	361	154	331	349	150
Saidapet ..	1	1	7	2	2	106	65	71	113	67	73	105	65	69
Madras	1	4	19	14	16	520	184	400	539	198	416	523	182	401

Province.	In-patients—*cont.* Balance on 31st March 1907. Equines.	Bovines.	Other animals.	Out-patients. Number treated during the year. Equines.	Bovines.	Other animals.	Average daily attendance. Equines.	Bovines.	Other animals.	Total number of in- and out patients treated during the year. Equines.	Bovines.	Other animals.	Total.	Receipts. RS. A. P.	Expenditure. RS. A. P.
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pithapuram ..	1	1	..	97	483	179	3	7	3	106	505	180	791	1,104 0 0	1,104 0 0
Bellary	1	12	31	446	625	554	1	2	2	515	795	658	1,968	3,454 6 3	3,454 6 3
Madura	2	..	..	899	1,274	374	24	29	8	951	1,314	382	2,647	2,150 2 0	2,025 5 10
Trichinopoly ..	9	12	4	3,934	7,215	898	11	36	6	4,274	7,576	1,052	12,902	996 7 9	Not reported.
Saidapet	8	2	4	273	490	287	5	10	4	386	557	360	1,303	969 9 5	1,686 5 9
Madras	16	16	15	416	88	592	7	2	12	955	286	1,008	2,249	6,846 7 10	16,314 9 6

TABLE VI.—Abstract showing receipts and expenditure of Veterinary dispensaries during 1906–1907.

Province.	Receipts.						
	Last year's balance.	By Local Fund grants.	By Government grants.	By Municipal contribution.	By fees.	By other sources.	Total
1	2	3	4	5	6	7	8
	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.	RS. A. P.	RS. A. P.
Pithapuram	..	..	..	..	..	1,104 0 0	1,104 0 0
Bellary	..	1,511 8 5	360 0 0	..	362 11 9	1,220 2 1	3,454 6 3
Madura	..	2,002 0 0	..	..	148 2 0	..	2,150 2 0
Trichinopoly *	..	..	..	..	..	..	Not reported
Saidapet	..	..	2,011 6 7	..	884 7 8	85 1 9	2,981 0 0
Madras	9,080 4 8	..	..	..	6,846 7 10	..	15,926 12 6

Province.	Expenditure.						Balance.
	Pay.	Travelling allowance.	Medicines and instruments, etc.	Furniture, etc.	Contingencies.	Total.	
9	10	11	12	13	14	15	
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Pithapuram	984 0 0	..	..	..	120 0 0	1,104 0 0	..
Bellary	1,307 10 8	..	996 9 11	715 0 8	435 1 0	3,454 6 3	..
Madura	1,381 5 11	96 0 0	178 6 8	168 0 0	201 9 3	2,025 5 10	124 12 2
Trichinopoly *	..	..	..	..	..	..	..
Saidapet	876 0 0	..	388 14 1	..	421 7 8	1,686 5 9	1,294 10 3
Madras	10,996 3 2	272 8 7	1,583 9 7	816 0 4	2,646 3 10	16,314 9 6	—387 13 0

* Information not furnished.

TABLE VII.—Statement showing total strength of Subordinate Veterinary staff employed during the year 1906–1907.

Province.	How occupied.	Whether paid from Provincial or Local Funds.	Veterinary Inspectors.	Veterinary Assistants.	Subordinate staff not included in previous columns.
1	2	3	4	5	6
Madras	Itinerating and attending cattle fairs and shows.	Provincial	....	6	....
	In charge of hospitals.	District Boards	....	2	....
		Society for the Prevention of Cruelty to Animals, Bellary.	....	1	....
		Private bodies	....	1	....
		Provincial	....	1	....
	College work ..	Provincial	....	....	† 4

† One Assistant Principal.
Three lecturers.

TABLE VIII.—Return of stud bulls for the year 1906–1907.

Province.	Property of Government.					Property of local bodies.				
	Number on 1st April 1906.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1907.	Number on 1st April 1906.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1907.
		Number.	Average price paid.				Number.	Average price paid.		
1	2	3	4	5	6	7	8	9	10	11
Madras	6	..	..	..	6	..	..	..	..	..

TABLE IX.—Statement showing the main results of the working of Provincial Cattle Farms during the year.—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions under local bodies for the year 1906–1907.—*Nil.*

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions under local bodies during the year 1906–1907.

Horse, pony or donkey.	Province.	Stallions on register in 31st March 1906.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.	
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.
1	2	3	4	5	6	7	8	9
The stallions at stud are under the Provincial Department of Government.								
Pony	Madras	15	14*	15	315	328	22	28

* One of the stallions "Tigris" died in November 1906.

TABLE XII.—Average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1906–1907.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	RS. A. P. 24 14 7	RS. A. P. 23 14 7	..	..	The total expenditure for upkeep alone of Government stallions amounted to Rupees 4,484-9-2 and this has been distributed for fifteen stallions.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year.—*Nil.*

TABLE XIV.—Abstract of particulars regarding cattle fairs and shows held during the year 1906–1907.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animal sold.				
		Bulls.	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cattle fairs.									RS.	RS.	RS.	RS.	
Tinnevelly	6	16	76,500	1,050	750	2,000	Information not available.						
Cattle shows.													
Bobbili	..	45	172	58	..	167	..	58	..	60	90	..	..
Pithapuram	..	56	92	101	..	157	..	192	None sold.	75	70	..	..
Ongole	..	187	78	387	..	78	..	293	150	90	110	..	..
Ellore	..	3	110	104	..	32	..	214	150	80	75	..	..
Total ..	6	307	76,952	1,700	750	2,434	..	757	300	305	345	..	..

Province.	Amount realised in fees.	Total number of animals that competed for prizes.	Prizes awarded.					Amount actually awarded.	Number of medals awarded.
			From Imperial funds.	From Provincial funds.	From local bodies.	From other sources.	Total.		
	15	16	17	18	19	20	21	22	23
Cattle fairs.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Tinnevelly	Information not available.								
Cattle shows.									
Bobbili	..	500	600	325	300	1,480	2,705	1,186	4
Pithápuram	..	598	400	..	..	600	1,000	695	2
Ongole	..	1,023	1,000	..	750	2,162	3,912	3,143	4
Ellore	..	463	..	..	(No information).			..	2
Total ..	..	2,584	2,000	325	1,050	4,242	7,617	5,024	12

TABLE XIV-A.—Statement showing the cost of Civil Veterinary department during the official year 1906–1907.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
1	2	3	4	5
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1. Salaries of officers	34,851 15 0	..	..	34,851 15 0
2. Salaries of subordinates	..	8,317 12 4	..	8,317 12 4
3. Travelling allowance of officers	..	4,530 6 0	..	4,530 6 0
4. Travelling allowance of subordinates ..	..	3,631 1 6	..	3,631 1 6
5. Other allowances	..	596 12 5	..	596 12 5
6. Supplies and services	..	5,045 13 9	.	5,045 13 9
7. Contingencies	..	1,241 5 6	..	1,241 5 6
8. Prevention of diseases	..	..	..	..
9. Schools and colleges	..	20,778 11 9	..	20,778 11 9
10. Prizes at fairs and shows	2,000 0 0	325 0 0	1,050 0 0	3,375 0 0
Total ..	36,851 15 0	44,466 15 3	1,050 0 0	82,368 14 3

TABLE XV.—Comparative statement of cattle mortality for five years ending 1906–1907.

Causes of death.	Number of deaths among Cattle for the official year.				
	1902–1903.	1903–1904.	1904–1905.	1905–1906.	1906–1907.
Diseases.					
Rinderpest, diarrhœa and dysentery ..	16,555	17,655	19,772	19,050	31,611
Anthrax	13,496	16,887	14,996	13,474	12,082
Malignant sorethroat	9,063	13,769	11,317	8,838	9,086
Black quarter	2,989	7,616	7,683	5,952	4,168
Epizootic aphtha	11,456	4,683	2,767	4,074	2,794
Others	35,417	32,548	33,336	38,905	53,798
Total ..	88,976	93,158	89,871	90,293	113,539
Other causes.					
Snake bite	2,109	2,278	2,257	2,011	1,899
Wild animals	10,937	10,886	12,061	13,232	13,372
Criminal poisoning	71	71	52	58	43
Total ..	13,117	13,235	14,370	15,301	15,314
Grand total ..	102,093	106,393	104,241	105,594	128,853

STATISTICS of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during the official year 1906–1907.

Districts.	Number of deaths among — Cattle. From diseases. Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake bite.	By wild animals.	From criminal poisoning.
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám ..	1,228	1,973	406	718	346	294	1,083	6,048	60	205	..
2. Vizagapatam ..	206	919	460	221	116	304	536	2,762	32	53	1
3. Gódávari ..	674	716	1,217	386	114	107	12,314	15,528	76	68	4
4. Kistna ..	2,693	4,791	2,432	1,054	182	387	13,453	24,992	215	38	8
5. Guntúr ..	1,747	980	354	1,637	174	58	821	5,771	51	46	2
6. Kurnool ..	2,516	1,257	876	277	364	211	3,497	8,998	81	380	..
7. Bellary ..	1,531	550	480	200	408	138	3,086	6,393	26	165	..
8. Anantapur ..	804	398	555	287	502	110	3,055	5,711	21	262	5
9. Cuddapah ..	1,113	596	416	195	814	116	1,098	4,348	63	506	4
10. Nellore ..	1,484	301	592	249	97	38	1,360	4,121	162	90	2
11. Chingleput ..	48	78	209	104	37	42	228	746	91	15	..
12. South Arcot ..	156	187	723	324	92	158	3,275	4,915	125	203	1
13. North Arcot ..	118	244	244	79	132	99	898	1,814	181	744	3
14. Salem ..	49	159	123	70	134	154	684	1,373	89	273	1
15. Coimbatore ..	68	334	189	135	167	208	2,553	3,654	51	669	5
16. Trichinopoly ..	212	155	337	181	61	51	2,345	3,342	57	31	2
17. Tanjore ..	405	130	652	425	100	19	399	2,130	106	2	4
18. Madura ..	586	724	793	255	174	90	1,161	3,783	164	140	..
19. Tinnevelly ..	191	286	231	44	1	2	512	1,267	81	32	1
20. The Nilgiris ..	13	8	576	841	6	20	108	1,572	15	261	..
21. Malabar ..	13	399	190	1,321	139	175	114	2,351	106	2,894	..
22. South Canara.	431	140	27	83	8	13	1,218	1,920	46	6,295	..
Total ..	16,286	15,325	12,082	9,086	4,168	2,794	53,798	113,539	1,899	13,372	43

Districts.	Number of deaths among—*cont.* Cattle—*cont.* Total.	Grand Total.	Total stock by the latest census.	Horses and Ponies. From diseases. Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.	Total stock by the latest census.
	13	14	15	16	17	18	19	20	21	22	23	24	26
1. Ganjám ..	265	6,313	..	1	..	..	1	..	..	..	..	1	..
2. Vizagapatam ..	86	2,848	..	..	..	..	..	..	..	..	..	..	..
3. Gódávari ..	148	15,676	..	1	2	19	22	..	..	..	..	22	..
4. Kistna ..	261	25,253	..	3	3	20	26	..	1	..	1	27	..
5. Guntúr ..	99	5,870	..	..	..	2	2	..	..	..	..	2	..
6. Kurnool ..	461	9,459	..	2	1	28	31	2	12	..	14	45	..
7. Bellary ..	191	6,584	..	2	8	38	48	..	4	..	4	52	..
8. Anantapur ..	288	5,999	..	9	..	25	34	..	14	..	14	48	..
9. Cuddapah ..	573	4,921	..	1	..	3	4	1	1	..	2	6	..
10. Nellore ..	254	4,375	..	..	..	1	1	..	1	..	1	2	..
11. Chingleput ..	106	852	..	..	1	..	1	..	..	..	..	1	..
12. South Arcot ..	329	5,244	..	..	..	5	5	..	..	..	..	5	..
13. North Arcot ..	928	2,742	..	..	..	4	4	..	3	..	3	7	..
14. Salem ..	363	1,736	..	..	2	3	5	3	3	..	6	11	..
15. Coimbatore ..	725	4,379	..	1	..	16	17	..	4	..	4	21	..
16. Trichinopoly ..	90	3,432	..	..	1	8	9	..	..	..	..	9	..
17. Tanjore ..	112	2,242	..	1	..	9	10	..	..	..	..	10	..
18. Madura ..	304	4,087	..	3	2	8	13	5	33	..	38	51	..
19. Tinnevelly ..	114	1,381	..	2	..	2	4	..	..	..	..	4	..
20. The Nilgiris ..	276	1,848	..	..	..	..	..	..	10	..	10	10	..
21. Malabar ..	3,000	5,351	..	..	..	..	..	..	6	..	6	6	..
22. South Canara.	6,341	8,261	..	..	..	..	..	..	..	..	..	..	..
Total ..	15,314	1,28,853	..	26	20	191	237	11	92	..	103	340	..

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., Sur., L.R. and Agri.), No. 289, dated 20th August 1907.

The Hon'ble Mr. J. N. ATKINSON.

The reports of the Director of Agriculture and the Superintendent of the Civil Veterinary Department on the operations of their respective departments for the year 1906–1907 will be submitted to Government.

2. The report of the Director of Agriculture, which was due in the Board's office on the 15th July 1907, was received only on the 2nd August 1907. This delay, which has necessitated the late submission of the Board's report to Government, was due to the recent reorganization of the department and will not, it is hoped, recur.

3. There were ten agricultural stations at work during the year; including the newly opened one at Nandyal. The work on the *agave* farm at Hindupur has been so poor and disappointing that the Board is now considering the question whether its closure should not be recommended.

Experiments in sugarcane, conducted in the Samalkota agricultural station, have shown that greater care in the selection of healthy sets and in cultivation renders the crop less susceptible to disease. It is encouraging that the new canes are less subject to disease and richer in sugar than the local varieties and are being adopted generally in the delta. The attempts made to improve cotton cultivation by distribution of selected seed appear to have aroused much interest among the ryots although they were not attended with any great success. Another step in the same direction was to award a prize of two annas per acre to ryots who had grown pure cotton in certain tracts in the Kurnool and Cuddapah districts. The Director shows in his report that improvement is to be looked for not so much from selection of seed as from the introduction of careful methods of cultivation and experiments will be made in this direction.

4. *Agricultural associations and exhibitions.*—The Board notes with satisfaction the useful work done by the several Agricultural associations in undertaking experimental cultivation and organizing shows and exhibitions and hopes that, with the financial and departmental help afforded by Government, the sphere of their activities will expand.

5. The Government Botanist was mostly engaged in the management of the agricultural stations in his charge. A study by Dr. Butler, the Imperial Mycologist, of the fungus disease attacking the palmyra and the cocoanut trees in the Gódávari delta has led to the adoption of remedial measures which, it is hoped, will tend to its extirpation.

6. It is gratifying that there is a demand in private service for candidates who have been trained at the Agricultural College, Saidapet, and it is hoped that the new College to be started at Coimbatore will fully meet the demand. In accordance with the latest orders of Government, the first classes of the new college will be opened at Saidapet in January 1908 as the buildings at Coimbatore are not expected to be ready for the reception of students till the last quarter of the year 1908.

7. *Pumping experiments.*—The conduct of pumping experiments continued under the control of Mr. Chatterton, Director of Industrial and Technical Inquiries. Ten new installations for private persons were erected and got into working order in the year and eleven such installations were decided upon and machinery purchased. Loans under the Land Improvement Act aggregating to Rs. 19,500 were granted in six cases. The oil-engine, as a convenient method of lifting water for irrigation purposes, is gaining greater recognition. The work of the Special Deputy Collector appointed to conduct well-boring experiments for ryots in a part of the Chingleput district has disclosed the existence of extensive sub-artesian supplies in at least two of the tracts under investigation—a result which points to the desirability of making a systematic and scientific exploitation of the underground supply in other districts on the East Coast. The report (promised in paragraph 22 of Mr. Chatterton's memorandum at page 26 of the report under review) regarding the methods of utilizing the water in the sandy beds of rivers when visible flow has ceased will be awaited with interest.

8. *Meteorology.*—The rainfall registered at the various rain-gauge stations was tabulated as usual and the results published by the Meteorologist, Madras, and Deputy Director of the Madras Observatory. The total number of stations in the Presidency at the end of the official year 1906–1907 was 465 inclusive of 75 in the Native States or two more than at the end of the previous year; and of these 372 stations were inspected.

9. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction:—(1) Monthly season reports in three sections (rainfall, cultivation and prices of food-grains and salt); (2) Annual crop forecast reports in respect of cotton, paddy, ground-nut and gingelly; and (3) Quarterly reports of cattle mortality.

10. *The Madras Agri-Horticultural Society.*—The income of the society from various sources including the Government grant of Rs. 4,000 amounted to Rs. 21,183–11–5. The annual Flower show was held on the 24th February 1907 at the nursery gardens of the society.

11. *Veterinary College.*—The work of the college continued to be satisfactory and twelve students graduated in the year. None of the classes are up to full strength, a circumstance which the Superintendent attributes to the low rate of initial pay of Veterinary Assistants.

12. *Veterinary Dispensaries.*—There were six dispensaries at work during the year, viz., two Government dispensaries at Saidapet and Madras, two dispensaries at Madura and Trichinopoly under the respective District Boards, one at Pithápuram in the Pithápuram Estate and one at Bellary under the Society for the Prevention of Cruelty to Animals. The work turned out indicates the growing popularity of these institutions and the need for the establishment of similar institutions elsewhere. The attendance at the Madura hospital was so large as to raise doubts regarding the correctness of the figures.

13. *Veterinary Practising Staff.*—There are only six itinerating Veterinary Assistants in the department and they are unequal to the large demand for their services throughout the Presidency. The Board has approved the Superintendent's proposal that they should carry with them in their tour useful drugs and instruments and has in its Reference, No. 1762, dated 27th June 1907, proposed to Government that they may be permitted to draw mileage in lieu of daily allowance so as to enable them to incur the necessary expenditure. The reorganization of the department providing for the ultimate appointment of three Deputy Superintendents, fifteen Veterinary Superintendents, and 132 Veterinary Assistants has been recently sanctioned by the Secretary of State for India in Council.

14. *Cattle Disease.*—There was a decrease in preventive inoculation against cattle disease, the cause of which has not been explained. More satisfactory results may be expected when the staff is strengthened and expert assistance is made available in all affected tracts of the Presidency.

15. *Pony-breeding operations.*—There was an average of 22 coverings per stallion against 28 in the previous year. Out of 310 coverings of the previous year, the results have been reported in only 65 cases, the proportion of success being one in eight—a very poor percentage. It is hoped that the direct supervision of the operations by Veterinary Assistants in future will yield more satisfactory results. The work of the department in castration is encouraging and is likely to show large improvement with the expansion of the staff.

16. *Cattle Shows*—are increasing in popularity and will, it is hoped, increase in numbers likewise throughout the Presidency. The Government contribution towards the cost of prizes awarded amounted to Rs. 2,325 in the year.

17. *Cattle Breeding.*—The Superintendent makes no mention of the work of the six Government stud-bulls entrusted in the previous year to respectable ryots for breeding purposes. The Board presumes that their services are appreciated by the ryots. One more bull has since been purchased and stationed at the Madras Veterinary College and a few more will be purchased and distributed in the course of the current year.

(True Extract.)

L. D. SWAMIKANNU,
Secretary.

To the Secretary to Government, Revenue Department, with an appendix.

Order—No. 2619, Revenue, dated 23rd October 1907.

Miscellaneous.

Recorded.

2. The report embodies the result of the first year's working of the Department since its reorganization. The hope expressed in the review on the report of the previous year that the experts required for the Department would be speedily recruited has been realised. A whole-time Director has been appointed with two Deputies to assist him and all the specialists whose appointment has been sanctioned by the Secretary of State joined their posts within the year. The buildings required for the Agricultural College and Research Institute at Coimbatore are being pushed forward and it is hoped that they will be completed by September next. The large farm attached to the Institute at Coimbatore is also being brought into good order. In order to provide also for the due examination of local conditions, it is proposed to establish an experimental agricultural station in each important and distinctive agricultural tract. At these stations the agriculture of the tract will receive special study and improved and new varieties of local crops and improvements on local agricultural methods will be thoroughly tested. At present the extension of these agricultural stations is limited by the absence of a sufficient number of trained agriculturists but one new farm was opened during the year at Nandyal. It has thus been necessary to devote the largest amount of attention during the year that has passed to perfecting the organisation of the Department and for the next few years this subject must still occupy the first place until the Department is in a position to meet adequately the demands upon it.

3. Some useful practical work was also accomplished within the year. Experiments in sugarcane at the Samalkota agricultural station have been steadily directed to the production of canes which shall be proof against disease, and though no cane which is entirely immune has yet been discovered, it is said that with proper care and good drainage the amount of disease is steadily diminishing and the varieties now grown suffer very little. There was a keen demand from ryots in the Gódávari delta for the new canes and the Director considers that there is no doubt that in a few years they will entirely replace the local varieties. The attempt, however, to distribute these seed canes through the southern districts by establishing a sugarcane nursery at Melrosapuram was not successful as the site chosen proved unsuitable and the local demand small. The nursery was therefore closed. In regard to cotton, the chief conclusion to which the year's work led was that seed selection is less likely to produce important results than careful cultivation, so that even if improved seed supplies were available they would be of little use unless the ryots' methods of cultivation are simultaneously improved. The methods of drill-sowing and hoeing practised at Koilpatti are said to have shown results which attracted genuine interest among the ryots of the district. The experiments with jute culture are promising, but further experience is requisite. There was an extensive demand for ground-nut seed from the Palur farm and the Director considers that this important crop will be grown much more widely in future. The work done on the pepper-vine at Taliparamba has failed as yet to produce any results. The experimental farm which was opened in 1900 at Hindupur to enable the investigation of various points connected with the cultivation of the agave plant has not been very successful, the inadequacy of the staff of the Department having prevented the conduct of systematic investigations. The Board of Revenue is considering the question of recommending the closure of the farm and the Government will be glad to have a full report from the Board on the subject.

4. Mr. Chatterton continued the work of promoting the extension of irrigation by pumping, and the Government note with satisfaction that ten installations were erected and brought into working order during the year, while in eleven more cases machinery has been purchased and is in process of erection. In six cases, loans under the Land Improvement Act were granted for this purpose, but it is reported that this method of obtaining capital is not popular and ryots are beginning to take advantage of the hire-purchase system which has been introduced by Messrs. Massey & Co. The practical efficiency of the pumping installations necessarily depends on the certainty of the supply tapped; hence the discovery of subterranean water-supplies is a matter of great importance. Mr. Chatterton's demonstration of the existence of sub-artesian water-supplies in portions of the Chingleput district is of much moment, and his report indicates that there are many localities in which pumps can be profitably erected. The experiments in lanka cultivation under irrigation provided by pumping which are being carried out by Messrs. Innes & Co. of Cocanada are also of considerable interest, and the progress made in the development of irrigation under motor-driven pumps is one of the most marked features of the year's work.

5. A comprehensive scheme for the reorganization of the Veterinary Department has received the sanction of the Secretary of State since the close of the year. This scheme contemplates the establishment of Veterinary dispensaries at 82 stations in this Presidency which have been carefully selected in consultation with the local authorities and the formation of a pensionable Provincial service consisting ultimately of three Deputy Superintendents and of fifteen Veterinary Inspectors and of a pensionable Subordinate service consisting ultimately of 132 Veterinary Assistants. Veterinary aid will thus be available to the agricultural population both in the dispensaries and, by means of itinerating Veterinary Assistants, in their villages also. The scheme can, however, only be given effect to gradually as the necessary staff is trained at the Veterinary College.

6. Ten agricultural exhibitions and cattle shows were held in the year, and were mostly very successful. The Director reports that several of the District Agricultural Associations are doing useful work, and the Government hope to see the sphere of usefulness of these Associations greatly extended in the next few years. His Excellency in Council commends to the attention of the Associations the Director's suggestions that demonstrations should be carried out on the ryots' own fields and with

their own cattle, in order to combat the idea that improved processes are too expensive. The Central Agricultural Committee and the District Associations might also with advantage note the Director's opinion that the apprentices sent for training on the Government farms should be practical agriculturists.

7. On the whole, the year shows progress and is the commencement, it may be hoped, of a new era in the history of the Agricultural Department.

(True Extract.)

A. G. CARDEW,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement).
" Public Department.
" Educational Department.
" Inspector-General of Agriculture.
" Inspector-General of the Civil Veterinary Department.
" Minister of Agriculture, Argentine Republic.
" Entomologist to the Government of India.
" Monsieur Chailley Bert.

Copy to the Government of India, Department of Revenue and Agriculture (with C.L.).
Editors' Table.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1907-1908.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS

1908.

Maximum number of pages prescribed—

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Administrative report of the Director of Industrial and Technical Inquiries	..
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I

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1907-1908.

I.—STAFF.

There were no changes in the staff of the Department during the year under report. After his return from Pusa in April, the Agricultural Chemist lived at the Saidapet College of Agriculture till his house at Coimbatore was ready. Both he and the Principal occupied their new houses before the end of the year. The head-quarters of the Deputy Director of Agriculture, Southern Division, were fixed at Trichinopoly (G.O., No. 1574, Revenue, dated 21st June 1907) and those of the Deputy Director of Agriculture, Northern Division, at Bellary. The charge of the former includes all the Tamil Districts and the West-coast. The latter has all the Telugu Districts. No new Agricultural Stations were opened during the year. The management of the existing stations occupies most of the time of the Deputy Directors of Agriculture at present. It is hoped that when the Managers have acquired more experience they will not require such constant supervision as at present, and that the Deputy Directors of Agriculture will then be able to devote more time to touring in the districts.

2. The Director of Agriculture spent 230 days on tour and visited all the Agricultural Stations. He also attended the Agricultural Conference at Pusa in February. On the appointment of Mr. Sampson as Deputy Director of Agriculture, Southern Division, the Palur station was placed under him and the Samalkota Station was put under the charge of the Deputy Director of Agriculture, Northern Division. The Government Botanist is still on furlough. Rao Bahadur C. K. Subba Rao is acting for him. As this report was being written news was received of Mr. Subba Rao's death while on privilege leave at Coimbatore. His unrivalled knowledge of Madras Agriculture and keen interest in the work of the Department will make his loss heavily felt.

3. Mr. Main, Assistant Inspector-General of Agriculture, made a tour through the planting districts in May 1907 to enquire into the pests affecting the Coffee and Pepper. The Inspector-General of Agriculture visited the Presidency in January, and inspected all the Agricultural Stations and the Central Farm at Coimbatore.

II.—SCIENTIFIC AND NATIONAL ENQUIRY.

A.—Entomology.

4. As stated in last year's report, the Imperial Entomologist is reviewing the monthly reports of the two Entomological Assistants and giving them general instructions for their work. At the end of June Mr. C. W. Mason, Supernumerary Entomologist, was deputed to Madras by the Imperial Entomologist and was put in charge of the Entomological work of the Province till his return to Pusa in September.

5. Mr. Lefroy paid two visits to the Presidency, one in May, to study the "Surul" pest on the ground-nut crop near Villupuram in the South Arcot District, and one in February, when he discussed with Mr. Barry of Cocanada the lines of experiments to reduce the damage caused by the tobacco weevil. He made a thorough inspection of the collections of the Entomological Assistants at head-quarters, and visited the Palur and Koilpatti Agricultural Stations, and the Coimbatore Central Farm. He prepared a detailed list of the insect pests to be dealt with in the course of instruction at the Coimbatore College. The Entomological Assistant who will teach the students is now engaged in preparing his lectures, which are submitted to the Imperial Entomologist for approval.

6. The Entomological Assistants have been engaged in the investigation of the different pests reported from Districts from time to time. The most important work was done on the Surul ground-nut pest, an account of which will be published as a memoir of the Imperial Department of Agriculture. The existence of the potato moth in the Nilgiri district was established; a severe outbreak of the paddy stem borer in the Narasapur taluk of the Kistna district was investigated and remedies suggested to the cultivators. The pest was identified with that reported from Anantapur last year. The simplest recommendation is to plough up the stubble after harvest, to destroy the resting place of the caterpillars. Opportunity was taken of the Agricultural show at Ellore in May to depute the Entomological Assistant T.V. Ramakrishna Aiyar to deliver a lecture in Telugu on the pest, and specimens of its various stages were exhibited and explained. This excited a good deal of interest. Coloured plates illustrating the life history of the pest are being prepared by the Imperial Entomologist, and it is proposed to circulate these, if ready in time, with vernacular instructions, in any localities from which severe outbreaks are reported.

Other minor enquiries included a search for the parasite of the Indian Fruit Fly, and a report on the cotton boll worm on the Caravonica cotton plantation at Yetur.

7. Application has been made for the appointment of a third Entomological Assistant, as the teaching of Entomology at the Coimbatore College, which is to open this month, will take up most of the time of one of the two Assistants.

The best thanks of the department are due to Mr. Lefroy for his valuable help and advice freely given, and his supervision of the work of the Entomological Assistants.

B.—Mycology.

8. The operations for the suppression of the palmyra palm disease in the Gódávari district were vigorously prosecuted throughout the year, under the direction of Mr. A. A. Ferguson, I.C.S., Assistant Collector of Gódávari. His staff consisted of a Mycological Assistant, two Agricultural Inspectors, four Revenue Inspectors, one Assistant on the staff of the Imperial Mycologist, four Assistant Revenue Inspectors, and a plant collector from the Government Botanist's office. As the disease can only be detected when the central shoot of the tree dies and turns white, it is not sufficient to cut down all the trees so affected. A second, third, and even a fourth visit to the village is necessary to search for cases in which the disease may have been latent at the time of the first inspection. The Amalapur taluk, where the disease is worst, has been worked over four, and in parts five times in this way, and Ramachandrapur has been begun. There is a little disease in the Cocanada taluk, and in the Tanuku and Narsapur taluks of the Kistna district. It is estimated that there will be work enough to keep the present staff busy for almost

another year. The general opinion is that the disease spreads most rapidly during the rains and when the leaves are wet with dew. In the course of the next few months, therefore, it should be possible to judge, from the severity or otherwise of the outbreak, whether the operations promise to be ultimately successful. It can safely be said, however, that if left alone the disease would have spread far more rapidly. Before commencing work, a leaflet was drawn up by Dr. Butler, describing the nature of the disease and the object of the operations, and translated into Telugu. This was widely distributed among the ryots, and it is perhaps partly owing to this that no claims for compensation have been made. Considering that on a rough estimate more than 200,000 trees have been cut, the average value of which may be taken at Rs. 1–8–0 a tree, this also speaks well for the tact displayed by the staff. The most discouraging feature of the work is the apathy displayed by the ryots, who make no attempt to co-operate in the work, though every effort has been made to explain to them its importance. Dr. Butler inspected the operations twice during the year. The total expenditure during the year up to the end of February was Rupees 12,591-2-6.

9. During the year the cocoanut gardens of Travancore were reported to be suffering from an obscure disease. After a preliminary investigation by Agricultural Inspector, Balakrishnamurti, Dr. Butler visited the State, and discovered that the trees were suffering from a fungus which attacks the roots. He suggested some simple precautions to arrest the spread of the disease. A number of copies of his report have been sent to the Resident in Travancore and Cochin, and the Collectors of Malabar, South Canara, Tinnevelly and Coimbatore for distribution among the leading land-owners. Dr. Butler also kindly prepared a short leaflet for translation into the vernacular. This was sent to the Collector of Malabar for publication in the District Gazette. It was also suggested that copies of the pamphlet might be supplied to the leading landowners, and the pamphlet communicated to the Vernacular Press. Though the disease spreads more slowly than the palmyra fungus of Gódávari, much loss has already been caused by it in Travancore. It is hoped that Dr. Butler's timely warning will awaken the owners of gardens to the danger. At present it is not known to exist in British territory. The Department is greatly indebted to Dr. Butler for the valuable help received from him.

10. The important discoveries which he has made during the short flying visits to Madras, which alone the pressure of his other work permits him to make, emphasize the urgent need of an expert European Provincial Mycologist to carry on systematical research in the Province itself. The interests involved by the fungus diseases of the palm are enormous, and there must be many similar diseases awaiting discovery.

C.—Seed and Other Products Supplied to and Received From Other Provinces and Abroad.

11. These transactions are now becoming so numerous that only a few of the more interesting can be noticed. Numerous requisitions were received from the Reporter on Economic Products for varieties of pepper, for fruits, seeds and fat of *Bassia longifolia*, wild fibre plants, seeds of *Eucalyptus globulus*, and samples of commerical varieties of rice. A requisition for a metal tray and lotah was forwarded to Mr. Thurston. Samples of the kinds of fuel usually used in different parts of the Presidency were sent to the Director-General of Commerical Intelligence, who proposes to test their calorific value, with a view to ascertaining how far it would be profitable to substitute oil-stoves for cowdung bratties for cooking purposes.

A packet of lemongrass seed was supplied to the Imperial Department of Agriculture, Barbados, and a collection of Madras paddies and millets to the Ceylon Agricultural Society. A small quantity of Pearl Millet (*Pennisetum spicatum*) and Finger Millet (*Eleusine Coracana*) and "Hickory King" maize was kindly furnished by the Director of Agriculture, Transvaal, for trial on the Palur Agricultural Station.

Pennsylvania tobacco seed received from the Director of Agriculture, Eastern Bengal and Assam, arrived too late in the season for sowing.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

A.—Buildings and Laying Out of Farms.

12. The farm buildings at Coimbatore were taken over from the Public Works Department in July. The Principal and the Agricultural Chemist occupied their new bungalows on the farm in December. The Government Botanist's bungalow has also been finished, and is being used as a temporary Laboratory and Lecture room until the College itself is ready. The first batch of 22 students will be admitted this month. The College buildings themselves are well advanced. The roof is on, and the rooms and laboratories are being fitted up. It is hoped that it will be ready for the students to occupy it at the beginning of the next session.

G.O., Endt. No. 1762-A/08-1, Revenue, dated 20th May 1908, sanctioned the construction of ten separate hostels to accommodate six students each, to provide for as many different castes as possible. For the present the students will live in the "C" type quarters.

13. A double avenue has been planted along the Lawley Road. The upkeep of the road where it runs through the College lands has been made over to the Agricultural Department—(G.O., R.D., Mis. No. 1636, dated 27th June 1907). An installation of Mansfield's Oil Gas has been put in and is complete. A sub-artesian supply of good water for drinking purposes has fortunately been struck in a well near the College buildings, at a depth of 75 feet from the surface. The water of the surface wells is very hard and somewhat brackish.

14. The farm buildings at Hagari were taken over by the Deputy Director from the Director of Industrial and Technical Inquiries on the 12th February 1908. The rest-houses at Koilpatti and Samalkota and the Manager's quarters on the latter farm have been completed. The old Public Works Department Inspection shed at Palur is being reconstructed, to afford more room for the accommodation of officers visiting the farm. Quarters for the Manager and Assistant Manager have been sanctioned and five huts provided for the agricultural apprentices who are sometimes sent by District Agricultural Associations and private landowners to study the cultivation of ground-nut. A seed store has been sanctioned for Nandyal, and quarters for Assistant Managers at Hagari and Koilpatti.

Maps of all the farms have been prepared by M.R.Ry. R. V. Subramania Aiyar of the Agricultural College.

B.—Crops.

15. Detailed information regarding the work done on each crop and at each station will be found in the administration reports printed as an appendix to this, and in the separate scientific reports. All that is done here is to give a brief review of the work done on each crop.

Sugar-cane introduction.—The farm canes are now so well distributed throughout the Gódávari delta that ryots are able to obtain seed canes from each other. Manager Balakrishnamurti, who has spent the whole of last year travelling in the delta, told the Director of Agriculture that the farm canes would account for half the cane area, *i.e.*, for over 2,000 acres. A good exhibit of farm canes was sent to the Berhampur agricultural show in February. Many visitors to the show applied for seed canes, and sufficient to plant about 5 acres were sent to Berhampur in March.

16. In South Arcot it was estimated that about 60 acres were planted last year with the Mauritius canes. The produce of this when crushed in the Nellikuppam factory gave much better results in percentage of jaggery to juice and percentage of cane sugar. Mr. Neilson, the Manager of the factory, reports that this year the Mauritius canes account for 40 per cent. of the Nellikuppam sugar-cane area as against 13 per cent. last year. This shows that the ryots know that they are better than the local canes. Unfortunately there has been a great shrinkage in the cane area in the district on account of difficulties with the water-supply. Seed was also supplied free to the Kumbakónam Agricultural Association last year, and planted on

their farm near the town. The canes grew well, and it is hoped that this demonstration will lend an impetus to the introduction of sugar-cane in Tanjore. A small plot of cane planted at Taliparamba (Malabar) made extraordinary growth. Many applications have been made for seed. At present practically no sugar-cane is grown in Malabar, though the climate and conditions seem very favourable. The nursery at Melrosapuram was given up, as there was no local demand.

17. *Experiments on sugar-cane.*—A severe outbreak of disease on the Samalkota Farm proved that the rotation experiments, under which canes were being grown more frequently than usual, are a failure. A longer rotation will be adopted in future. The canes grown in the new nursery in the uplands were healthy. Among new varieties the Barbados seedling B. 208 gave a very good analysis. The manurial experiments showed that properly conserved cattle manure, a thing unknown in Gódávari, gives splendid results. The addition of about six rupees worth of fine bone dust to the castor cake, practically the only fertilizer used by the ryots, gave a net profit of Rs. 20. It is much to be desired that the bones, which are now exported on such a large scale, to the impoverishment of the country, should be utilized in India. The attention of sugar-cane growers will be drawn to this. Four Agricultural Managers were sent to learn Mr. Hadi's method of sugar-making at Panchli in the United Provinces in January.

18. *Ground-nut introduction.*—Applications for seed continue to be received from all parts of the Presidency. On the Samalkota and Coimbatore Farms, where it was tried for the first time, the crop was satisfactory. Small trial plots in South Canara having given good results, Government have granted a sum of Rs. 500 to encourage the introduction of the crop. Much dry land in that distrtct, at present lying waste, would yield remunerative crops of groundnut. A note on the cultivation of ground-nut on the west coast was prepared by Mr. Sampson, and widely circulated throughout Malabar and South Canara. Trial plots in the former district as well have given good results. Mr. Sampson has prepared another note of more general application, on the cultivation of ground-nut, which will be published shortly as a bulletin of the Department, in view of the increasing interest taken in the crop. Kurnool, Cuddapah, Anantapur, the Kistna uplands, the Pollachi division of Coimbatore, and Tinnevelly are some of the localities in which ground-nut has lately been introduced.

19. *Experiments on ground-nut.*—The experiments with new varieties at Palur show that the local seed continues to give the best results all round, though some of the foreign varieties seem to be improving as they are getting acclimatized.

The manurial experiments, the main object of which is to test the result of applying lime in different forms, will not yield any definite results for some time. In connection with experiments on paddy, however, it has been proved that the leaves and stalks of ground-nut are a cheap and very effective manure for paddy. At present this valuable bye-product of the ground-nut crop is allowed to be eaten by the village cattle and its manurial value is largely wasted.

The cultivation experiments at Palur are designed to reduce the cost of growing the crop, by substituting bullock-power for cooly labour in sowing and cultivating the crop, and by economizing in seed and water. At present the amount of hand-labour employed is so large as to restrict the cultivation of this crop to thickly-populated tracts.

20. *Pepper.*—The scientific report of the Taliparamba Agricultural station for the past year gives a very full account of the system of pepper cultivation and the varieties of pepper. No results can be expected from the experiments for some years. It has been shown, however, that careful preparation of the land and the application of leaf-mould greatly reduces the losses of young plants.

21. *Cotton—Seed distribution.*—The failure of rain in the neighbourhood of the Bellary station diminished the demand for farm seed. Out of a total of 6,707 lbs. of seed from this and the Hagari Agricultural station, only 4,873 lbs. was disposed of for seed purposes. In the Tinnevelly district, seed cotton of pure karunganni was purchased from selected growers, and seed sufficient to sow about 3,000 acres was distributed. There was a good demand, and far more could have been sold, had it been available. It was at first reported that many ryots were dissatisfied with the results of our seed. It has since come to light that where the results were poor, this

was due to the germinating power of the seed being higher than they were accustomed to. In spite of being warned not to sow so much as usual, they sowed the usual amount (12 lbs. per acre instead of 5 lbs., which is enough). They were then advised to thin their crops. They rejected the advice. They now admit their mistakes, and say that they will follow the advice given to them, next year, and are anxious to buy seed from us again. The demand is probably due to the fact that the ryots appreciate the care taken in drying and preparing the seed. Karunganni, however, being a superior variety to uppam, the continual distribution of pure karunganni seed on a large scale cannot fail to have a good effect on the cotton crop as a whole.

22. Whereas the owners of hand-ginneries insist on the kapas being well dried before it is brought to them, cotton is often sent to the power-ginneries in a wet condition. This spoils the germinating power of the seed. Ginning by power costs about half as much as hand-ginning, and the hand-ginneries, which used to be found in all important centres, are therefore disappearing. Ryots consequently find it harder every year to buy good seed. It would seem, therefore, that there is room for a large extension of seed distribution by Government. Competition is too keen among the large buyers, who own the power- ginneries, to permit of their combining to make the ryots deliver their kapas in a dry state. It would be to the great advantage of the industry if this were possible. Arrangements are being made to buy pure karunganni cotton sufficient to sow about 10,000 acres this year.

23. *British Cotton Growing Association grant.*—Rupees 3,000 received from British Cotton Growing Association were spent last year in the purchase of karunganni cotton and some samples of the commercial cotton, as it comes into the market at Virudupatti and Tuticorin, representing the north and south portions of the district. The cotton was ginned and the lint baled and sent to the British Cotton Growing Association for valuation, the seed being kept for distribution. The report was satisfactory, as it confirmed the view already formed here that karunganni is the more valuable variety. Karunganni cotton from the Koilpatti farm was valued at $5\frac{1}{2}d.$, and the report stated that the samples compared very favourably with machine-ginned Broach. The grant has now been discontinued, but the balance of Rs. 2,484-7-0 (kindly made up to Rs. 3,000 by a special grant from the Inspector-General of Agriculture) is being utilized for the same purpose in the current year. The seed cotton is purchased from ryots who have sown our seed the previous year. Pure karunganni crops only are bought for seed distribution, and efforts are made to get them to thin out their crops and also, as far as possible, to drill them, with a view to improving the strain by good cultivation.

24. *Cultivation.*—In last year's report it was stated (page 6) that the distribution of good seed should be accompanied, if not preceded, by efforts to improve the ryots' methods of cultivation. In pursuance of this policy, five expert coolies from Bellary were brought to Koilpatti last year to teach the use of the country—drill and bullock—hoe. The farm crops had already been sown in rows the previous year. About fifty selected ryots tried drilling their cotton for the first time this year. Implements were supplied free of cost, and expert coolies were sent to help them. Those who tried drilling were satisfied with the results, and it is expected that about 1,000 acres of privately-owned land will be sown with the drill this season. Mr. Sampson's remarks on the subject in the Administration Report of the Koilpatti Farm deserve a careful perusal. The work done at this station during the past year is of the highest value and importance. These results are due, in the first place, to Mr. Sampson's excellent management, and, secondly, to the good work done by Assistant Managers, Tirumuruganathan Pillay, in charge of the farm, and S. Ramaswamy Pillay, in charge of the seed distribution. Both officers belong to the agricultural classes, and have succeeded in gaining the confidence of the ryots.

25. *Cotton experiments.*—The permanent manurial experiments at Koilpatti will be given up, as they are not likely to yield results of practical value. The advantage of a moderate application of properly conserved cattle manure has been strikingly demonstrated. The cotton crops on the farm this season were very good; it is expected that over 1,000 lbs. of kapas per acre will be picked from the best plots. The ryots now see for themselves that this is not due to any greater expenditure, or

other means beyond their power to adopt; but mainly to the thorough cultivation, which is only possible in drilled crops, and the use of good seed. The fields of a ryot adjacent to the farm, who had followed the farm methods, were as good as the crops on the farm itself.

The best plants have been selected in the field by Mr. H. C. Sampson, and their produce is being carefully examined with a view to getting an improved strain. The same plan was followed with regard to the hybrid and crossed cottons, which included some fine plants. Individual trees have been found, the produce of which yields 33 per cent. of lint, against the usual yield of 25 per cent.—26 per cent.

26. On the Nandyal farm the different varieties, Tellapathi or "Northerns", Gadag or "Koomptas", Yerrapatti, and "Cocanadas", which are found in a mixed state in the ryots fields, are being separately studied.

"Northerns" or pure Tellapatti gave a better yield this year, but the statement in the Administration Report that the lint was of better quality is incorrect. A bale of each was sent for test to the Carnatic Mills Company, who report that Gadag or "Koomptas" is slightly better both in colour and strength of staple. Further experiments will be necessary to decide which is the more profitable crop.

A premium of two annas an acre to cultivators who grow practically pure crops was paid in respect of 1,074 acres.

At Hagari, Egyptian cotton was again a failure. Experiments in irrigating country cotton will be continued.

27. *Paddy.*—This, the most valuable and important crop of the Presidency, is now receiving the attention it deserves. Experiments are being made on all the wet land farms to ascertain the best number of seedlings to plant in a bunch, and the best distances for planting. Mr. Sampson was the first to commence these experiments on some of the Home Farms under his management under the Court of Wards. Their object is, firstly, to see whether better crops, *i.e.*, crops yielding more grain of better quality cannot be got by allowing each plant more room for the proper development of its root system; as many as fifty tillers have been observed on a single plant which had full room for development; and, secondly, to save waste of seed. The cost of weeding is reduced, and possibly an economy of water can also be effected. As much as 150 lbs. of seed is sown per acre in parts of the Presidency. In the Southern districts probably the average is not less than 80—100 lbs. per acre. It is believed that 20 lbs. of good seed would be ample. On the Saidapet Farm 3·90 acres planted at the rate of 11·5 lbs. of seed per acre gave a normal crop. If, as seems to be the case, equally good or better crops can be raised without any extra cost, with the smaller seed rate, the saving of 60 lbs. of seed per acre would mean a large addition to the food supply of the country. It is estimated that the area under paddy in the Presidency is about 7,400,000 acres.

28. On the Coimbatore Farm the singly-planted plots gave, on the whole, results equal to those planted on the local system. Mr. Shepperson's interesting account of his experiments, in the Administration Report, is typical of the work being done on all the farms. At Palur singly-planted Banku paddy as a "Kar" crop gave 1101 M.M. per acre against 740 M.M. of local Kar paddy planted in the local way. In the Tinnevelly district, where the seed rate is 150 lbs. per acre, the demonstration of the advantages of single-planting of paddy by the brothers Dharmaranga Raju, Deputy Collector, and Chelvaranga Raju, of the Agricultural College, on their own land at Palamcottah has attracted much attention, and it is estimated that 2,000 acres were planted in this way last year. A similar movement is in progress in the Tanjore and South Arcot districts, where a small landowner near Chidambaram, named Abaranam Pillai, discovered the advantages of the system for himself.

The exact amount of seed necessary, and the exact distance for planting has to be determined separately for each locality.

29. The question of the proper treatment of paddy lands in the dry season is also being studied on all the farms where there is wet land. This includes the subject of green manuring; and ploughing up of fallows. In some parts, *e.g.*, in Kistna and Coimbatore the ryots declare that the latter practice is injurious. In others, as

in Malabar, it is regularly practised on the best lands. Arrangements are being made at Coimbatore and Samalkota for a series of experiments on the amount of water required to produce a full crop of paddy.

30. At Hagari the experiments have been hampered by the difficulties about the water-supply. The new well which, it was estimated by the Director of Industrial and Technical Inquiries would yield 2,000 gallons a minute, has actually given only one-tenth of the quantity. Much difficulty has also been experienced with the engines, and the new 7½ horse-power engine has not yet been got to work. The experiments show that, when bringing regada soil under wet cultivation, the chief trouble is to get the soil into a suitable mechanical condition. The seasonal experiments are being conducted in accordance with Board's Proceedings No. 77, dated 11th March 1907.

31. *Fibres.*—The Samalkota jute crops were somewhat disappointing. The Bengal Fibre Expert visited the experimental plots of jute in Tanjore and Malabar, and reported that the comparative failure of the crops was due to late sowing and want of weeding and thinning. He remarked that "the prospects of jute in Madras are decidedly hopeful. It is true that only one plot was really successful, but several others, grown by people entirely unfamiliar with the crop, were on the verge of success." Government has sanctioned a grant of Rs. 1,000 for jute experiments in the Gódávari and Tanjore Deltas. The best prospect of success at present seems to be on the West Coast, where Mr. Sampson found a specimen of Bengal Jute (*Corchorus capsularis*) growing wild, near Shiradi in South Canara. In Malabar about sixty people intend to try jute this season.

32. At Coimbatore an experiment was made in growing *Hibiscus cannabinus*, usually grown under well irrigation, as a partly rain-fed crop. Four waterings were given, and the crop was fairly successful. Results are not available at present, but they point to the conclusion that *Hibiscus cannabinus* would pay at least as well as most of the dry land crops, if there was a steady demand for the fibre. At present little comes into the market, each ryot growing a small patch for his own consumption. The leaves are eaten as a relish, and the fibre extracted afterwards.

33. *Agave.*—Experiments with sisal gave 3 per cent. of fibre, and an estimated acreage yield of 495 lbs. of fibre per acre. A small hand-prepared sample was valued in London at £36-£38 a ton with Mexican sisal at £34. Little weight can be attached to valuations of small samples, but the plantation will be maintained and extended with a view to further experiments in planting, and for supplying public bodies with plants for fences, etc. The justification for this station is that an attempt is being made to find a use for land which has no value for ordinary agricultural purposes, and to create a cottage industry.

34. *Irrigated dry crops.*—The ridge and furrow system of irrigation is being compared with the flat-bed system at Coimbatore, where arrangements have been made for accurately measuring the quantity of water used by each system. On the ridges the cholam is dibbled in by hand, and the cost of this is only a trifle more than that of sowing and ploughing in the seed. The same method has been successfully employed with transplanted ragi, onions, and sweet potatoes at Koilpatti, and at Palur with ground-nut.

35. *Encouragement of the irrigation of dry crops under the Ponnalur tank.*—The Collector reported that the tank breached in December 1906 and there was, therefore, insufficient water in it for the irrigation of the early crops in 1907. In G.O., No. 1269, Revenue of 7th May, Government have sanctioned the continuance for two years more of the concession under which water is supplied without charge for the irrigation of dry crops.

36. *Experiments with saline lands in the Periyár tract.*—Only one ryot qualified for remission of assessment by undertaking the reclamation of saline lands.

The Therkutheru farm experiments were continued by the Public Works Department. The Deputy Director of Agriculture, Southern Division, and the Agricultural Chemist visited the farm, and took samples of the soil. Proposals will be submitted in due course for a general survey of the saline tracts. The question appears to be mainly one of drainage, and extensive investigations will be necessary before any detailed scheme can be submitted.

37. *General.*—In pursuance of a suggestion by the late Mr. Beauchamp of the "Madras Mail" an Agricultural Calendar was published for the first time. This contained vernacular proverbs suitable for the seasons, and short popular articles on matters of agricultural interest, such as the care of cattle, the single planting of paddy, seed selection, inoculation for rinderpest, irrigation by oil-engines. Illustrations were furnished by Mr. Cecil Wood. It is hoped that some attention was attracted to the work of the Department by this means. The Calendar will be brought out annually for some time at least.

C.—Agricultural Associations.

38. Cattle and agricultural shows were held at Bobbili, Berhampur, Cocanada, Ongole, Tirupur, Madura and Trichinopoly. A few of the associations are doing useful work, prominent among these being the Ganjám Association, which had a very successful show at Berhampur, and is exerting itself to introduce the Mauritius sugarcanes into Ganjám; the Kumbakónam Association, whose demonstration farm awakened much interest in the single-planting system for paddy, and in the cultivation of sugarcane. It also arranged for experiments with Bengal jute on the lands of some of its members. The Tinnevelly Association has seconded the efforts of the department in the introduction of the drill and bullock-hoe. It has also popularized the single-planting system for paddy, and arranged for the local manufacture of cheap iron ploughs for wet and dry land, of which several hundreds have been sold.

The Coimbatore Association held a successful cattle-show at Tirupur, and is getting a set of boring tools made with a view of searching for artesian supplies of water in existing wells. Similar work has been undertaken by the Madura Association.

In Malabar, mainly through the interest taken in Agriculture by the Collector, Mr. Francis, and his Divisional-officers, Messrs. Wood, Ellis, and Hall, a very useful programme of experiments on the lands of private individuals has been drawn up. The work consists of the introduction of ground-nut and Bengal jute, and the single-planting of paddy. Mention must also be made of the interest shown by Messrs. Karunakara Menon, in the Malapuram Association, and Rao Bahadur Chinnasawmy Pillay of Palghaut.

In South Canara, the Collector, Mr. Aziz-ud-din, and the Coondapur Divisional-officer, Mr. Doig, are using their influence with the Associations to introduce ground-nut. A grant of Rs. 500 has been made by Government for this purpose, and an agricultural apprentice sent for training at Palur.

A small quantity of Mauritius sugar-cane was introduced by the Mangalore Association last year. At Kurnool the Agricultural Association has a small farm on which it is trying different varieties of cotton for comparison. In Government Order, No. 2093, Revenue Department, dated 20th August 1907 the free supply to Agricultural Associations of the Forest Sheet of District Gazettes was sanctioned.

39. Every effort made to get useful work out of the numerous Associations which exist, most of them in a state of suspended animation, brings out more and more clearly the general ignorance of practical agriculture which prevails among the educated classes, which include in their number many of the largest land-owners. It was reported that a certain land-owner in one of the wealthiest districts was looked upon by his neighbours as weak in the head, on account of the active interest which he took in practical agriculture. The Associations are to some extent making it fashionable among these classes to know something of agriculture. They still contain few genuine cultivators, the mass of whom have no belief in or wish for change. The unseasonable downpour of rain which occurred last year near Koilpatti was attributed by some ryots to the introduction of the seed-drill, displeasing to the local divinities.

IV.—BOTANY.

40. The Government Botanist was on furlough during the year under report. Rao Bahadur C. K. Subba Rao was acting for him. He has been engaged in the preparation of bulletins on fig and sunn-hemp cultivation. His report is printed as an appendix.

V.—AGRICULTURAL APPRENTICES.

41. Two farm coolies were sent for training by private individuals to the Koilpatti station, and three from South Canara, Madura and Malabar to Palur. These were reported to be genuine agriculturists. One sent by the Gódávari Agricultural Association to Samalkota was unsuitable, and after frequently absenting himself he was withdrawn by the association. The Ganjám apprentice completed his year's course, and is now employed by the Ganjám Agricultural Association. Two other apprentices had a short course of training at Saidapet.

VI.—AGRICULTURAL EDUCATION AND RESEARCH.

42. The Saidapet College was closed at the end of the Calendar year, and the buildings have been made over to the Public Works Department. The Vice-Principal reports that numerous applications for admission were received, and the demand for the services of trained candidates was greater than in previous years. Ten students in all obtained the diploma. A syllabus and rules have been drawn up for the new College at Coimbatore. No scholarships will be offered, but no charge will be made for tuition and lodgings. Candidates for admission are required to have passed the Matriculation Examination, but members of the agricultural classes, who possess a sufficient knowledge of English, may be exempted from this rule. The usual course of study will be three years; a short course of one year is also provided for students who do not wish to go through the full course. The College will open in June 1908. A large number of applications have been received. The Agricultural Chemist has been engaged in routine analytical work during the year and in preparing the lectures and laboratory work for the students. He has commenced to investigate the mechanical and chemical changes which occur in the soil when dry land is converted into wet, and this, together with several minor investigations, will be further studied when the permanent laboratories are fitted up. The present temporary laboratories are unfitted for anything but routine analytical work. The Principal has had eighteen months, while waiting for the opening of the College, in which to familiarize himself with practical Indian Agriculture. He has visited most of the Government Agricultural Stations, and he also accompanied the Director of Agriculture on a tour in the Tanjore district. The Coimbatore farm has been brought into very good condition, and some important lines of experiment have been taken up. Mr. Shepperson writes: "The crops grown were those usually found in the locality, and very few attempts were made to grow a crop foreign to the district. Attention was paid to methods of cultivation rather than to obtaining results with a liberal application of manure." These lines of work may be expected to yield results of practical value to ordinary ryots.

43. *Publications.*—A bulletin on fig and grape cultivation was prepared by the Acting Government Botanist, and translated into Telugu and Tamil. A Tamil leaflet on jute cultivation was also published. Mr. C. K. Subba Rao also prepared a bulletin on sunn-hemp cultivation, and Mr. Sampson one on the cultivation of ground-nut. The number of publications received from and sent to other Provincial Departments and countries was as follows:—

	Indian.	Foreign.
Journals received	18	62
Bulletins do.	61	409
Reports do.	390	85
Total ...	469	556
Number sent	9	...

MADRAS,
9th June 1908.

M. E. COUCHMAN,
Director of Agriculture.

APPENDIX I.

ADMINISTRATIVE REPORTS OF THE AGRICULTURAL STATIONS AND THE MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES DURING THE YEAR 1907-1908.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, NORTHERN DIVISION.

The division of the Presidency occurred at the beginning of the year under report and on the 20th of April I handed over charge of the farms included in the Southern division to Mr. Sampson. My head-quarters continued until September to be at Coimbatore when I was transferred to Bellary. I was on duty the whole year with the exception of nine days' casual leave; 242 days were spent in camp involving journeys of 11,959 miles by rail, 521 by road and 28 by boat.

2. *Staff.*—The Sub-Assistant Director was relieved on the 30th of April to take up the post of acting Government Botanist.

The staff at present available consists of three Farm Managers and four Assistant Farm Managers. Some trouble has been experienced in getting suitable men to take up farm clerks' posts. The Hagari station was without one for some time. The work of my office has also been carried on under difficulties. I was without a second clerk for some time, and the transfer in September made it harder for the two clerks left to keep up with their work. No office building is yet available.

3. *Work.*—This is of a varied nature. During the year a new classification of accounts and a new system for maintaining farm records was worked out in consultation with the Deputy Director of Agriculture, Southern Division: it is now in use. The management of the farms still takes up the greater portion of my time partly owing to the inefficiency of the staff generally. District tours were made whenever possible and I spent some time in the Anantapur, Bellary, Kurnool, Cuddapah, Gódávari and Ganjám districts. A good deal of time was occupied in assisting Agricultural Associations in organizing exhibitions and replying to queries from them and private individuals. Requisitions for seeds were in most cases complied with. Several private gardens and estates were visited and advice given about crops and cultivation.

The Bellary Agricultural Station.

The year under report has at this station been one of failure owing to the failure of the rains; only one field of cotton gave anything like a crop and consequently the experiments in which this crop should have been grown this year have yielded no results. Main crop (hingari) jonna gave a small yield of withered fodder in the tillage plots; the mungari varieties of sorghum though severely tested gave more satisfactory results. Of experimental work there is accordingly little to report. The work of plantwar selection of cotton taken up last season for the first time is being continued. The examination of the second year's selection is now proceeding. The results appear to be extremely satisfactory. The piece of waste referred to in last year's report has been taken over, cleared and the whole southern and western boundary fenced. The well in No. 6 B has been enlarged with somewhat disappointing results. Some necessary drainage works were carried out in No. 7 while the spoil from the well has been utilised in making a cart road along the boundary between this field and No. 6 C.

2. The dry weather interfered with the distribution of the farm selected cotton seed, farmers in this district being accustomed to purchase their seed only at the last moment when the land is actually ready to sow. Out of a total of 6,707 lbs. from this and the Hagari Agricultural Station, 905 lbs. were utilised for sowing the two farms and for distribution free to the Anantapur Agricultural Association. Of the remainder 2,661 lbs. was sold at 15 per cent. above the ordinary market price to 117 individuals. It was originally intended to let no one have more than eight annas worth but later in the season this was abandoned. In order to push the sales a shop was rented in the bazaar and a conspicuous notice in the vernacular displayed. The total amount distributed in all ways was 4,873 lbs. leaving 1,834 lbs. which was utilised for cattle food. The stock of seed available this season is much smaller though *per contra* the demand is likely to be greater. Seven sets of Ceded districts implements were distributed during the year; four of these were for the use of the Home Farms in estates under the Court of Wards. An exhibit was prepared for the Mysore Dasarah exhibition which secured a bronze medal and some money prizes.

3. Three of the farm cattle were sold during the year and one pair was transferred from the Hagari station.

4. The farm is not visited so much as it should be by local cultivators. The Farm Manager or the messenger has been told to visit the market regularly on market days with samples of cotton and persuade the ryots to visit the farm. This has been to a certain extent successful : the excellence of the farm cultivation is generally admitted but its expense objected to. It may be noted that the crop in No. 7 was this year the only cotton crop near Bellary.

The Hagari Agricultural Station.

The year's record at this station was one of steady progress.

2. *Paddy experiments.—Irrigated cotton.*—Nine acres in field No. 2, the field intended for irrigation experiments were levelled and laid out into plots and paddy sown in August and September. The yields from the first crop were naturally low but were higher than had been expected. A further area of nine acres was laid out for second crop but owing to shortage of water only three acres could be taken up. The paddy plots in Nos. 21 and 10 were devoted to experiments to discover the effect of season on paddy : two plots in each field are being sown each month throughout the year.

The water-supply has been very much lowered. It is not yet possible to say how much land can eventually be brought under permanent wet cultivation since secondary station has not been able to cope with the supply received from the big engine. A new engine is being established and next season 18 acres of wet land should be readily double cropped.

The experimental irrigation of country cotton was successful from a financial point of view. The cost of applying the water, excluding the cost of the water itself, was about Rs. 1–8–0, while the increase in cotton due to the single irrigation was valued at Rs. 8 per acre. The experimental cultivation of Egyptian cotton was again a failure. The establishment of this cotton under irrigation on lands commanded by the Tungabhadra project would make its financial aspect so much more certain that further trial is desirable. Sown early in the basins it should be more successful. A crop of country cotton raised in one of the basins yielded over 300 lbs. of kappas to the acre. This may be attributed as much to the moisture in the soil as to the fertility of the silt deposited.

3. With regard to dry crops experiments were carried out with regard to the discovery of the best method of spacing cotton. These were unsuccessful owing to the drought, though it may be noted that the basin crop mentioned above was spaced out 2 feet each way, that is, there were not more than $\frac{1}{10}$ of the number of plants usually sown per acre.

The season for all dry crops has been very severe : both korra and main crop jonna have almost completely failed. The farm is unfortunately overstocked with bullocks and the shortage of fodder will affect the balance sheet severely. It is not possible to sell them as there is now no demand. Two pairs have been supplied to the Nandyal Agricultural Station and three bullocks were sent to Bellary. One bullock died during the year. All the farm cattle were inoculated against rinderpest in June last.

4. The farm paddy cultivation is an object of interest to those farmers who own wet land along the Hagari river, while the engine and pump at the secondary station near the Kuggal Road attracts the notice of passers-by. Probably due to the demonstration at this station is the fact that two engines and pumps have recently been set up at Palthoor. The objects of the experimental work at this station are not capable of easy explanation though the selected cotton seed obtained from Bellary is getting known : a neighbouring Reddi grew 100 acres under an agreement but the crop was unfortunately lost. Avenue trees were planted along the farm roads during the year. Some wattle acacias obtained from Australia show signs of being useful trees for the sand dunes. Their growth is at present very satisfactory and as their bark possesses value as tanning material they may prove to be worth introducing. Casuarinas have been planted out along the river bank with moderate success. The season was all against the work.

5. Farm Manager M. Mangesha Rao deserves credit for his work during the year.

The Nandyal Agricultural Station.

This station is now in full working order. It has been properly fenced ; quarters for the Manager, cooly lines, an implement and cattle-shed and an office have been erected while quarters for a farm clerk and a seed-store are nearing completion. During the year a well was sunk, and the proper drainage of the farm was attended to.

2. Definite progress on the three lines of investigation pursued at this station may be recorded. The comparative trial of northern cotton and Gadag cotton have in a dry year proved the superiority of the former ; it produced better quality of lint ; its slightly lower percentage was more than counterbalanced by the higher yield of kappas. The general farm cotton crop was undoubtedly superior to the surrounding crops ; this may be put down to the use of better seed and the greater attention given to details of cultivation such as thinning and topping. The Farm Manager was moreover lucky in sowing early in August ; most of the neighbouring farmers decided to wait for more rain and could not get their seed in until the latter half of September.

3. Efforts were made to attract visitors to the station and the local presses were of much help in sending their clients to see the farm cottons; since it is hopeless to suppose that the department can ever supply seed to the whole district, the simple methods by which each farmer may select his own seed supply have been frequently explained. A small amount of seed was distributed with results partly encouraging—since the crop was reported by the growers to have yielded much more than local seed; and partly disappointing—since, in spite of careful and continuous instruction in the matter, the recipients did not take the trouble to pick the strains separately. Offers have already been received from one or two influential reddies of the district to place their land at the disposal of the department for growing seed and to carefully follow the department's instructions in growing and harvesting the crop.

4. Investigations on the jonna crop have not yet definitely indicated a variety to be recommended for early sowing. Red No. 1, a strain selected at Bellary, did well the first year; the seed is sweet and is much appreciated as a luxury; but it was declared by some Odders who were at the time engaged in digging the farm well to be not sufficiently nourishing for men doing hard work. This season all the early sown varieties did poorly. The farm soil is locally known as one which will not stand much wetting and the heavy rain soon after mungari sowing gave the jonna a bad start.

Plots to compare three rotations introducing indigo, with the local two-year rotation of cotton and jonna, have been laid out and the first crop obtained. Careful valuation of the outturn will indicate definitely the profit or loss to be expected from growing this crop.

5. Interest in the farm cotton soil plough (Massey No. 1) is being aroused, and to meet the requests for its loan, two more ploughs have recently been ordered and will be lent free to any farmer who applies for them.

6. Two pairs of bullocks were received from Hagari in May 1907. One has been lame ever since it arrived and has never been able to do more than light work. A Veterinary Assistant has recently been treating it without at present any improvement.

7. The farm has been in charge of Farm Manager, Raghunatha Rao, assisted from 23rd October 1907 by a farm clerk. The Manager has, besides his work on the farm, toured in the district in connection with the grant of premia for the growth of pure cotton in this district.

The Samalkota Agricultural Station.

A serious recrudescence of the sugarcane disease has unfortunately to be reported this year. The cause of this is believed to be due to the shortening of the rotation. It will be remembered that in the dry area of the farm, that is the area where wet paddy is never grown, a crop of canes is taken every other year. On the rest of the area canes are grown once in three years, the intervening crops being wet paddy. This area has this season been far less affected by the disease and it has been thought wise in these two areas to lengthen the rotation to a three and four year respectively. The system of dry cultivation with the resulting improvement of the texture of the soil has thus not shown itself any better in enabling the cane to withstand the disease. The overlapping of the two cane crops, harvesting and planting proceeding simultaneously make it impossible in a two-year rotation to prevent infection whether such is conveyed in the air or in the soil. It is satisfactory to report that the canes grown on the upland piece, which is being again rented this year, are satisfactory, there being no trace of disease. The additions to the varieties include some new seedling canes obtained from Java and Barbados. The best of these was B. 208, a cane which gave an extraordinarily good analysis. It succumbed very early to disease in the variety plots but kept healthy in a plot planted round the manurial plots. B. 376 was also good. These will be grown this year in the uplands. The varieties distributed were the same as last year; the local demand was, however, small. It seems that a large business is being done in the selling of farm canes in the delta and the difficulty of arranging to get canes from the farm on the days when water will be let into their fields makes the ryots prefer to get their supplies from each other even though they pay a higher rate. Further complaints are heard of disease in the old farm canes, and until a new seedling cane or other variety has proved itself worthy of distribution it seems probable that the local demand will not be extensive. A large consignment was sent to the Berhampur Agricultural Association as a result of a fine exhibition of canes at the Berhampur Exhibition and the success attained the year before with red and striped Mauritius canes grown by the Association's Agricultural officer who had received his training at Samalakota. Attention may be called in the manurial plots to the splendid crop produced by the application of farm yard manure made on the loose box system; the profit from this plot exceeded the profit obtained by the use of castor cake by Rs. 120 per acre. The application of a small quantity of bonemeal was also profitable. The endeavour to find a substitute for the present laborious method of wrapping and tying the canes has proved a failure and the experiment is now discontinued. Experiments to ascertain the saving to be derived from the wider spacing of transplanted paddy and the best distances to be maintained were started during the year and will be extended during the coming season. The question is one of the utmost importance as there is no question that a large quantity of seed can be saved while the grain from properly-transplanted plots is probably of better quality. The fibre plots were continued with moderate

success. One plot yielded at the rate of 866 lbs. It would appear that the best chance of introducing this paying crop is to sow it in April or May on ordinary wet lands and take a crop of paddy after it. It requires however a fine seed-bed and it is somewhat difficult to obtain this. Cultivation should be started a couple of months before. The fibre was fairly well reported on but should have been better: the differences in value between first and second quality jute are very marked. Two qualities of jute grown on the farm were valued at Calcutta at Rs. 6 and Rs. 4–11–0 per Bengal maund (82 lbs.) : Gogu fibre was valued at Rs. 6–8–0 per maund.

2. Of miscellaneous crops on the farm, ground-nut is the most important. It was introduced for the first time during the present year and yielded over 1,280 lbs. per acre. It is being continued this year.

3. The land taken up in the "uplands" was cropped with canes and jute. The former grew fairly well and were quite free from disease. The latter was sown in April, May and June: the April plot gave 850 lbs. per acre, but the other two plots were failures. The land is being rented again this year.

4. Two innovations in the management of the farm are the introduction of permanent coolies for whom quarters on the farm are being found, and the trial of the share system of cultivation, under which one field will be cultivated entirely by farm coolies to whom money will be from time to time advanced, one-half the yield of jaggery being ultimately taken. A scheme for improving the water-supply is also under consideration.

5. The rest-house and Manager's quarters have been completed during the year under report: the old office has been converted into quarters for the clerk and the yard and the threshing floor and the implement-shed have been transferred to the high ground between the store and the Manager's quarters. The farm cattle have, with the exception of minor ailments, been generally in good health. The two stud bulls have been sold for their original price to the Ellore Agricultural Association as the demand for their services was not sufficiently great to warrant their retention.

6. The farm has been visited throughout the year by parties of cultivators to whom the objects and scope of the experiments have been explained.

The Hindupur Station.

Samples of fibre extracted from Agave rigida (Var: sisalana), Averacruz (American aloe) and Furcroea sp: at the beginning of the present year were forwarded to the Imperial Institute for report and valuation. It is satisfactory to note that the fibre was valued higher than Mexican "sisal", the relative prices being £36–£38 per ton and £34 per ton. The value was reduced owing to the colour being a little uneven. The A. Americana was valued at only £27–£28 per ton under the same conditions: Furcroea fibre was valued at £26–£27 per ton (with Mauritius hemp at £24–£30): it was described as superior to many specimens of this fibre recently received. Its extremely low precentage of fibre, ·34 per cent. of the weight of the leaf makes it quite impracticable to grow. Sisal or veracruz gave 3 per cent. and 1–4 per cent. respectively.

2. Experiments were also carried out to endeavour to ascertain the yield of leaf per acre. A cutting in May gave at the rate of 16,517 lbs. per acre: a further cutting off the same plants yielded in October 3,532 lbs. At three per cent. on the weight of the leaf this is 495 lbs. and 105 lbs. of fibre per acre, respectively.

3. It has been decided to extend the plantation for the twofold purpose of carrying out further experiments in method of planting and also to keep a stock of this variety for supplying outside demands. There seems little reason why on the drier and rockier soils it should not largely replace agave veracruz—the common American or blue aloe.

BELLARY,
4th May 1908.

R. CECIL WOOD,
Deputy Director of Agriculture, Northern Division.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, SOUTHERN DIVISION.

The Taliparamba Agricultural Station.

Charge, objects and area.—The Taliparamba Agricultural station has been under my charge since 10th May 1907, when it was handed over to me by the Principal of the Agricultural College, Coïmbatore. The object of this station is the study and cultivation of pepper, but as there is a considerable area of wet and modan land included within the farm boundary, several other investigations of interest to the west coast conditions are receiving attention. The area of the station remains the same as last year.

2. *The season.*—The south-west monsoon though it did not arrive until the 10th of June was particularly heavy and from that date till the end of August 138·5 inches of rainfall were recorded—more than the whole annual rainfall of either of the two preceding years. After

that showers were experienced till the end of December and ·13 inch of rain were recorded in February. The severity of the monsoon, attended by strong winds caused much of the pepper to shed, and the continuous rains prevented the late flowering pepper from setting. Newly planted pepper cuttings as well as standards also suffered.

3. *The pepper crop.*—A fair yield of pepper was obtained—nearly $2\frac{1}{2}$ times last season's yield. Early-planted pepper cuttings have struck remarkably well and this is attributed to the careful preparation of the soil by digging and applying leaf-mould before planting. This seemingly obvious and necessary operation is quite contrary to the local practice, which is to plant first and dig afterwards and never to manure or apply leaf-mould. The effect of small quantities of lime with leaf-mould has been included among the manurial plots, but in all other respects the work is a continuation of that started three years ago. It is too soon yet to draw any conclusions from the various experiments. Improvements are noticeable but until the shade has been properly regulated and until the young vines have started to bear, it is impossible to say whether these are due to shade, aspect, cultivation, manuring or variety.

4. *Other crops.*—This agricultural station has been of use in other directions however. A series of paddy-spacing experiments successfully demonstrated that better crops of paddy could be grown with a lower seed rate and not such close planting. The experiment was watched with interest by visitors to the farm. Sugarcane was grown on 5 cents of land and attracted so much attention that 79 applications for cane sets were received from people who wished to grow these Mauritius canes. Jute, gogu (*Hibiscus cannabinus*) and sunn-hemp were sown in April as fibre crops and it was successfully demonstrated that good fibre could be grown on the west coast. Samples of the fibre sent to the Fibre Expert of Bengal were valued in Calcutta at Rs. 9–4–0 per maund for jute, Rs. 9 for gogu and Rs. 4 for sunn-hemp, the price of jute being at the time from Rs. 3–8 to about Rs. 9. More than sixty people intend to grow jute experimentally during this coming season. The cultivation of cholam (*Andropogon sorghum*) as a fodder crop was again a failure, but a more promising field for investigation lies in the study of the better indigenous grass under cultivation. Several of the best fodder grasses were collected and planted and two—Ambanpullu (*Andropogon contortus*) and Injikanapullu (*Panicum repens*)—of them have been found to grow right through the hot weather.

5. *Staff and touring.*—The staff consists of a Manager and an Assistant Manager. The Manager has spent a considerable time in touring. Besides giving advice and instructions regarding pepper and other cultivation in the adjoining taluks, he has toured in the Wynaad to see the methods of pepper cultivation adopted on several estates there. Twice he has made extensive tours in the South of Malabar, on one occasion to instruct members of local Agricultural Associations who had grown experimental crops of jute in the process of retting and on the other to ascertain the area likely to be planted with jute this coming season, so that arrangements for seed could be made in advance.

6. *Miscellaneous.*—The boundary fence enclosing the farm has been completed by the Department of Public Works during the year, and several other improvements have been effected departmentally—notably the construction of a storeroom, a cattle-shed, covered manure pits, a road leading up to the inspection bungalow and the lining with cut laterite stone of the two wells dug last year. Lantana which was spreading very rapidly on the wooded hill sides was completely cleared, and can now be kept in check with little trouble. Some two acres of jungle on good hill soil was uprooted and this will enable several crops, likely to be of value in the district to be tested. A pair of local working cattle have been purchased for the cultivation of the wet lands.

The Palur Agricultural Station.

Charge, objects with which the station was started and area.—The Palur Agricultural station has been under my charge since May 1st, 1907, when it was handed over to me by the Director of Agriculture. The primary objects of the farm were two—firstly, to study all the aspects of ground-nut cultivation and secondly, to introduce improved varieties of sugarcane into the district. To carry out this work 51·69 acres of land had been acquired, about 32 of which are dry and 20 wet land. The whole cultivated area has this year been brought under direct cultivation.

2. *The season.*—The season has on the whole been favourable. As one would expect, the first three months were very hot and dry, only 1·27 inches of rain being recorded, but after that seasonable rains fell at regular intervals until the end of December. During the first fortnight of November 21·00 inches of rain were recorded and twice during that time the whole farm was submerged under water causing some damage to rainfed groundnut crops. The delay in clearing the channel from the Tiruvadi anicut prevented many of the wet land operations being done in due season; thus the sugarcane planting was not completed until the middle of May and the jute was not sown until June. The channels were again choked up by the heavy rains in November and the paddy crop suffered from want of water at the most critical period of its growth.

3. *Dry land crops.*—Groundnut was grown under well irrigation on 7·60 acres of land. This was sown in February and March 1907 and harvested in July and August 1907. A series of manurial experiments were started then and the cultivation of varieties continued. This

area has again been planted in February 1908 and an additional area of one acre has been put under irrigated groundnuts on which different methods of cultivation and irrigation are being tested. *Rainfed groundnuts* were sown on 11·8 acres in August and September. Varieties were again tested and the local practices and mixed cropping were investigated and compared with other and newer methods of cultivation. On the remaining dry land areas the following rotation crops were grown :—cholam (*Andropogon sorghum*) mixed with pulse as a fodder crop for the farm bullocks, indigo varieties, fibre crops. Besides these, several irregular pieces of ground near the farm boundaries were utilised for growing guinea grass for fodder; and varieties of cotton, as well as two varieties of cowpeas received from the Inspector-General of Agriculture were tried. Both these last have proved to be much superior to the local varieties and will be grown on a larger scale next year.

4. *Wet land crops—Sugarcane.*—The whole of the 1906–1907 crop of improved canes as well as most of those grown at the Melrosapuram cane nursery were distributed to cultivators in this district and more than 60 acres were cultivated with these varieties. These have been greatly appreciated by all who cultivated them except where they were grown on low-lying badly drained land. The 1907–1908 crop is again being distributed free, but since the superiority, both in yield of cane and in the quantity of sugar over the local cane, is now fully realised only a limited quantity of 250 canes is given to each applicant, provided he was not supplied the previous season. Many ryots are now applying for these and several applications have also been received from other districts, notably Tinnevelly, Tanjore and Malabar. The department is greatly indebted to Mr. Neilson, the Manager of Messrs. Parry & Co.'s factory at Nellikuppam, for the assistance which he has rendered in introducing these canes and also for the following information regarding the superiority of the Mauritius over the local cane :—

Description of canes.	Brix.	Pounds of jaggery per 10 gallons of juice.	Co-efficient of purity.
		LB. OZ.	
Mauritius average of 31 results	18·66	21 8	85·36
Local average of 1,159 results	17·00	19 5	79·50

Now that the object of introducing these improved canes has been accomplished the area under sugarcane on the agricultural station will be reduced to 2 acres. This will render more land available for experimenting with the paddy crop which until this year was grown merely as a rotation crop for sugarcane. Several experiments were started this year with *paddy* cultivation. These include the following :—Methods of sowing and planting, manuring, green-manuring and varieties. These already show prospects of giving much valuable information of a kind which can be readily disseminated and they at the same time indicate the lines on which the experiments can be extended.

5. *Diseases and insect pests.*—The groundnut crops were not badly affected with "tikka" this season but the rainfed crop suffered severely from the "surul" caterpillar. One of the Entomological Assistants spent six weeks at this station and as a result the life history, habits and natural parasites of this pest have been fully worked out. Several remedial and preventive measures were exhaustively tried including "light traps", "spraying" and "bagging". Mr. Lefroy, the Imperial Entomologist, now considers that, after the "bagging" has been given a further trial, the results of this investigation can be published.

6. *Implements.*—Two bullock power waterlifts were tested on the station. These were erected by M.R.Ry. Rao Bahadur C. K. Subba Rao Avargal, Acting Government Botanist and one of them was considered sufficiently promising to have a properly constructed lift of that type erected. This is now nearly completed and will be erected in a few days. Attempts were made to secure a waterlift from the Deputy Director of Agriculture, Sindh, which is reported to work well, but owing to scarcity of skilled labour there, this could not be procured before the end of the year. Improvements in the shape of the country plough and the introduction of a harrow for after-cultivation have been appreciated. Demonstrations have been held and samples of these have been lent to several villages around the station and left in charge of the monigar. Both of these implements should prove extremely useful for the local dry land cultivation.

7. *Staff and touring.*—The staff of this station consists of a Manager, two Assistant Managers and a clerk. The agricultural officers have all had an opportunity of touring. The Manager besides attending to the Melrosapuram nursery while it was still being worked by the department has toured in the Tanjore district on three occasions and given advice and instructions to members of the local Agricultural Associations on the cultivation of trial plots of sugarcane and jute. He was also sent to the United Provinces to learn Mr. Hadi's method of making sugar. The Assistant Managers have each toured in the South Arcot district making enquiries regarding onion and sunn-hemp cultivation and the general practices of dry land cultivation with mixed cereals and pulses in the Chidambaram, Kallakurichi, Villupuram and Tindivanam taluks.

8. *Miscellaneous.*—An additional area of 64 cents was acquired during the year, as a site for officers' quarters. The work of building these was put in hand as soon as possible and they will now soon be completed. Two apprentices were trained on the station and quarters were built to accommodate five apprentices. The cattleshed was extended to accommodate two extra pairs of bullocks obtained from the Saidapet Agricultural College Farm. Besides this an implement shed and a maistry's house are under construction. One of the wells which fell in was rebuilt and all the farm buildings were put into good order. Applications are frequently being received from all parts of the Presidency for groundnut seeds and 8,057½ Madras measures have this year been distributed. Many ryots and others visit the station and for their convenience all the plots have this year been labelled both in the Vernacular and in English. Many of them say that they will try on their own lands the new methods adopted on the farm which they see to give good results.

The Koilpatti Agricultural Station.

The Koilpatti agricultural station has been under my charge since April 20th, 1907, when it was handed over to me by the Deputy Director of Agriculture, Northern Division. The station is really two farms, a block of 25 acres on the red soil where most of the farm buildings are situated and another block a mile distant of 115 acres situated on the black cotton soil. There appears to have been no object in taking up the red soil block except that it was suitable for the erection of the farm buildings. The soil is naturally a thin coarse red gravelly loam, very unequal in quality and very shallow in places. It lies near the foreshore of a tank and the lower fields are often submerged or waterlogged when the tank is full. A small area has been considerably improved during the last few years by heavy applications of tank silt, but, much of it is so shallow or so badly drained that it would only be a waste of time and money to attempt to improve it. The black soil block was considerably extended in 1906 with a view to growing pure seed for distribution but in G.O., Mis. No. 1056 of 6th May 1907 orders were passed that the whole area should be devoted to the experimental cultivation of cotton. This, of course, cannot be brought about in a moment, nor would it be advisable as fresh problems constantly arise for which land will be necessary, besides which the ordinary rotation crops have to be considered.

2. *The season.*—This has been exceptionally favourable. Very good rains fell in April and May which meant an excellent summer picking of cotton—nearly 40 per cent. of the whole crop—good sowing rains fell with the north-east monsoon and the majority of the crops were thus sown in good time. The monsoon ended suddenly on November 10th when 7½ inches of rain fell. This caused considerable damage. Tanks were breached all over the country, and none of the rivers or drains could cope with this volume of water. The stream which flows through the farm overflowed its banks and swept through the crops washing away the soil and levelling the fence to the ground. Small rivers were flowing in all directions. From this time on till the end of February very little rain was experienced, but owing to the system of after-cultivation adopted on the farm the crops continued to grow well and record cotton crops are expected.

3. *Crops on the black cotton soil.*—Under cotton the following experiments were continued—Permanent manurial experiments with cotton every year. These have given some interesting results from a purely scientific point of view but are of no practical value. The cultivation of cotton year after year without any rotation is absolutely unsound and this course could never be advocated to the ryot. The outlay on manures is prohibitive for dry crops which have to depend on rainfall only. The percentage of lint is decreased in some cases as much as 5 per cent. It seems therefore that such an experiment is out of place on a District Agricultural station and if necessary at all, it should be carried out on the farm attached to the Research Institute at Coimbatore. Full details of this experiment will be found in the appendix to the Scientific report of this station. The manurial experiments with cotton grown in rotation with a cereal, are of much more value and many of the manures used here are within the reach of the dry land cultivator. It is here that the relative merits of the different system of collecting cattle manure are tested, and the cotton crop of this season shows these to be infinitely more valuable than any of the expensive artificial manures applied. One plot where cattle manure collected in a loose box was applied at the rate of about 7 tons per acre has yielded up to the end of the official year as much as 739 lbs. of kappas per acre and it is expected that the total yield will be well over 1,000 lbs. per acre or more than 250 lbs. of lint. A series of rotation experiments in which the effects of deep and shallow tillage are also being tested was started this year. The system of cultivation and the effects of selection have so improved the characters and habits of the local cottons that a series of spacing experiments is to be started, and preliminary trials to define the lines on which these should be conducted have been made during the last two years. Next season will see these properly started. The artifically fertilised cottons have this year been grown on a more extensive scale and the best plants have been tentatively selected. The kappas, lint and seed of each plant is now being weighed separately and several plants have been found to give as much as 33—34 per cent. of lint. If this character can be perpetuated it means that 1,500 lbs. of kappas instead of 1,900 lbs. will be required to make one bale of 500 lbs. of lint and it will also mean that the ryot who now usually sells his kappas will give this in his own village and sell the lint. In this way the supply of seed will be greatly improved.

A similar method of selection has been adopted with the crops raised from specially selected seed, and even here plants are found which give more than 32 per cent. of lint. All the available pulse crops have this year been under observation as a black cotton soil crop, as it is considered that there is a great need of a suitable pulse crop in the local rotation. Cumbu (*Pennisetum spicatum*) fodder cholam (*Andropogon sorghum Irunguvar*) have been grown as rotation crops for cotton. Paspalum dilatatum has been removed from the red soil block to the black soil where it has been planted on an irregular piece of lowlying land. Though this, in sub-tropical climates grows well on black cotton soil, it is very doubtful, if it will ever hold its own at low elevations in the drier regions of the tropics.

4. *Crops on the red soil.*—The ridge and furrow system of irrigation has again been demonstrated on the well irrigated lands. Ragi (*Eleusine coracana*) has again given an increase of more than 200 lbs. per acre under this system of irrigation. Ground-nuts were tried as a monsoon dry crop, but proved a failure, the season not being long enough to properly mature the crop. The fruit trees have been greatly improved by altering the system of irrigation. Guavas have done exceptionally well and as this promises to be a profitable cultivation on this class of land, it is proposed to plant up a larger area of land and treat this as an orchard under suitable cultivation. Several of the dry cereal crops commonly grown on this class of land were grown on the poorest portions of this area, while onions and sweet potatoes, and maize were cultivated on land commanded by wells.

5. *Diseases and insect pests.*—The following insect pests were noticed on cotton. The grey weevil which attacks the plant when in the seed leaf devastated one field of 5·7 acres. The same pest was reported to be doing considerable damage in Satur and Viruduppatti, but by the time an Entomological Assistant arrived, a rain had fallen, and the weevil had disappeared. The cotton aphis appeared in February and many of the ryots' crops suffered severely from this. The farm crops owing to their vigorous condition were however only slightly affected. The "Ver-puchi" was noticed in large numbers on the groundnut crop and specimens were collected by the Imperial Entomologist who visited the farm and who states that this is a species of Sphenoptera. Specimens of three fungoid diseases were forwarded to the Imperial Mycologist; one, a disease which does not appear to have been investigated before and which attacks the young cholam grain causing great loss through the whole of my division; another, the tobacco mildew, and a third, an obscure disease which attacks cotton.

6. *Agricultural operations outside the Agricultural Station.*—Though not actually a part of the operations on the agricultural station, the whole of the work carried out with the grant for cotton improvement is an outcome of the farm operations. Karunganni cotton, which now that it has been grown pure in a sufficiently large area to determine its value compared with Uppam was purchased and the seed sold to ryots. Agreements were taken out with ryots who grow the crop pure to sell kappas to the department. This was carefully dried, sorted, ginned and screened and the lint was sent to the British Cotton Growers Association for report. Their valuations will be found in the scientific report of the station. One hundred and fifteen pothies of seed of 250 lbs. were thus sold. The resultant crops were not as satisfactory as could be wished, the seed was too good and at the ordinary seed rate the crop came up much too thickly. The ryots were advised to sow a lesser seed rate, but they were unwilling to do so. They were advised to thin their crops when they were found to be too crowded but only the few who did this were more than satisfied with their crop, though many of them now realize that had they taken the advice given they would have had much better yields. As reported last year the methods adopted on the agricultural station for the cultivation of cotton attracted much attention and 50 persons, chiefly good black soil cultivators, agreed to try this system on their own lands. Thirty sets of implements, each consisting of a blade cultivator, seed drill, and three bullock-hoes, were made on the farm. Coolies, used to the working of these, were brought down from the Bellary district, and with their aid and that of the farm coolies, two hundred acres were thus sown and cultivated. Everywhere, where this has been tried the ryots speak well of the system. The crops are more vigorous and can withstand drought much better than the broad casted crops besides which the cultivation expenses are less. Many have asked for assistance this year to sow and cultivate their crops in this way and many of those who were assisted last year have already made arrangements with their own carpenters and blacksmiths to make these implements. It is expected that next season over 1,000 acres will be sown in this way. These experiments, conducted by ryots themselves, have done far more to spread the usefulness of the station than any amount of demonstrations conducted on the farm itself. Advantage has also been taken of fairs and local festivals to demonstrate these implements, but it is difficult to say whether work in this direction has borne much fruit.

7. *Staff and touring.*—The staff consists of an Assistant Manager in charge, two Assistant Managers and a clerk, besides which an Assistant Manager has been on special duty in connection with the outside work of cotton improvement. All the Agricultual Officers have done a considerable amount of touring in the district and have, I think, gained the confidence of the ryots. The number of ryots who visit the farm is constantly increasing. The objects of the farm are explained to them and, though this occupies much of the officers' time, it is felt that it is time well spent.

8. *Miscellaneous.*—An inspection bungalow has been completed by the Department of Public Works but has not yet been handed over. An Assistant Manager's quarters have been built on the black soil and several improvements are being carried out; such as the repairs of drainage channels on the black soil and the carting of silt on to the red soil. The cattle are in good condition though early in the year there was a serious outbreak of foot and mouth disease.

The Attur Agricultural Station.

This agricultural station has been under my charge since 18th April 1907 when it was handed over to me by the Deputy Director of Agriculture, Northern Division. The reasons why this land were handed over to the Agricultural Department are stated in paragraph 4 of B.P., No. 7532 of 24th December 1905, and the following were laid down as the main lines of experiment:—the thorough trial of perennial and exotic cottons under irrigation and the growth of fodder crops. The cultivation of fruit trees was also recommended as of secondary importance; while object lessons in the conservation and application of cattle manure should be demonstrated. The fact that practically the whole of the farm is covered to a considerable depth with drift sand from the Pálár river seemed to have been overlooked; hence the efforts of the department, while being of little use to the district, have mainly been directed in planting wind breaks to check the drift of the sand and in trying to improve the surface by application of clay and silt and by heavy manuring.

2. Under the present condition of the farm, however, a thorough trial has been made during the past three years with exotic and perennial cottons but only one has up to the present given a heavier yield than can be expected from a dry crop of indigenous cotton on good cotton soil. Seed has been selected from the best plants of several varieties to try again this coming season, but little hope can be held out of any ultimate success especially when these have to be cultivated on drift sand. Several fodder crops also have been tried. Lucerne grown under irrigation in 1906–1907 soon died when the hot weather set in. Maize under irrigation was sown on 1·40 acres of land and manured with 15 loads per acre of cattle manure, but this only produced a total of 2,282 lbs. of *green* fodder. Fodder cholam was grown as a dry crop in 1906–1907 on 13½ acres of land, but this did not even produce sufficient straw to feed the three pairs of farm bullocks for the year. This year the straw crops have yielded even less. Guinea grass was accordingly planted on the land from which the maize had been harvested, after manuring with cattle manure at the rate of 28 cart-loads per acre and this is now being cut daily and fed to the farm cattle. Up to the end of the year 12,660 lbs. of green fodder had been cut. It was with the greatest difficulty that this was properly established as the surface sand dried out very rapidly after irrigation and the water at the time of irrigation washed the sand away from the forming roots. The yield of green fodder can now only be maintained by heavy manuring with cattle manure at frequent intervals. Fodder cholam under irrigation and heavy manuring is being grown this hot season to supplement the fodder supply for the farm cattle, which have been increased to four pairs. It is evident that this costly system of cultivation merely to feed four pairs of cattle is not one which would appeal to the ordinary dry land cultivator who has to maintain himself as well as his cattle, and that, as the manure produced by four pairs of cattle is but a small fraction of that required to grow ordinary crops on such poor land, it is impossible to demonstrate satisfactorily its preservation and application. The cultivation of fruit trees holds out a little hope of success as these are deeper rooted than ordinary crops. Two and a half acres of cocoanuts have been planted near the river bank and three acres of a wind break of mangoes, besides several lines of cashewnuts for the same purpose, have been planted, while six thousand casuarinas have been planted on the river banks and on the eastern boundary. Only the cocoanuts, however, require watering by direct flow, so that, even if the area of fruit trees is extended, the pump—the object and origin of the farm—will not be required for their irrigation, except for hand-watering.

3. It is therefore apparent that, as none of the original lines of work can be properly investigated and that, even if results had been obtained, they would be of no value to the district, some other line of work had to be developed in order to try and justify the existence of the expensive machinery and outlay on the station. Accordingly, intensive garden cultivation, which was tried on a tentative scale last year, has been considerably developed during the latter part of the year and it has been found that, with very heavy manuring, copious irrigation, constant hand-weeding and attention, a few of these garden crops can be profitably grown. Even these results, however, have little or no actual value. Much of the success is due to very local facilities. Manure (of which some 1,400 loads have been purchased) can be obtained from the Chingleput Municipality. Markets for fresh produce are at hand both in Chingleput and, by means of the railway, in Madras, while the water-supply of the farm is quite beyond the reach of the ordinary cultivator of the poor dry land of the district.

4. The staff of the station consists of a Manager and an Assistant Manager. Very little touring has been done as it is not possible to test improvements on the farm lands. Much of the officers' time is occupied in maintaining the engine and irrigation records, which however can be of little value when far more water than is actually required by the crop has to be poured on to the sand before the irrigation of a field is completed.

5. *Miscellaneous.*—Brick and chunam water channels have been constructed to carry the irrigation water over the drift sand and under the road to the east block. The fencing has been extended on the northern boundary to the river bank. An extra pair of bullocks have been purchased to cope with the carting of manure from the town.

TRICHINOPOLY,
1st May 1908.

H. C. SAMPSON,
Deputy Director of Agriculture, Southern Divn.

THE ADMINISTRATIVE REPORT OF THE CENTRAL FARM AT COIMBATORE.

The land selected for the Agricultural College and Research Institute and Central Farm is situated mainly in the village of Thelungapalayam, three miles to the west of the town of Coimbatore, and was acquired in February 1906. The total area of the estate is 450·88 acres, of which 45·50 acres is wet land irrigated from the Krishnambuthi tank, which is itself supplied from the Noyil river by the Chitrachavadi channel. On the dry land, both red and black soils are represented and the characteristics of both varieties vary very considerably in different parts. One hundred and twenty-six acres of black land and 161 acres of red land are under cultivation, the remainder of the estate being occupied by buildings, compounds, etc., and works in connection with the building operations. In the south-west corner of the Farm, there is a patch of distinctly alkaline soil. On the western half of the farm, there are eleven wells for irrigation; the water from these is however highly charged with salts.

2. The Farm is at an elevation of about 1,350 feet above sea level and is approximately flat, there being a difference of 37 feet between the highest and the lowest points, which are 1,650 yards apart. The difference of level between contiguous fields on the red block is just sufficient for efficient irrigation.

3. *Climate.*—The south-west monsoon sets in about June 1st, causing a considerable drop in temperature but bringing little rain; what does come is in the form of drizzle and, owing to the high wind, irrigation has to go on practically the same as in the hot weather. The south-west wind begins to slacken about the middle of August and the north-east wind sets in about the beginning of October, bringing with it the greater part of the annual rainfall. In December, there are occasional rains but January, February and sometimes March are dry months. In April and May, thunder-storms are expected, which enable ploughing to be commenced. The climate is decidedly dry and, without irrigation, only one crop is possible during the year. There are two main seasons for sowing; April, for an irrigated crop of cholam which is reaped at the end of July; and August, for the main crop of cholam reaped in December or early January. On the wet lands, water is received about the middle of July and the paddy harvest is in January. Cottons are sown at the beginning of October and picking commences in March and last into May. The thunder-storms experienced in April and May give the cotton plants a fresh start and a second picking of somewhat inferior cotton is sometimes obtained.

The last year was characterised by an excess of rainfall, amounting to about $\frac{1}{8}$ of the total; hence, the seasons were, on the whole, favourable. The Kar rains, *i.e.*, those of April, were particularly heavy. The following table gives particulars of the rainfall, compared with the records of Coimbatore town, three miles away:—

RAINFALL during 1907–1908.

Locality.		April.	May.	June.	July.	August.	September.	October.
1		2	3	4	5	6	7	8
Agricultural College.	Rainfall .. In.	3·56	1·74	2·60	0·84	1·39	1·93	5·87
	Number of days upon which rain fell.	8	10	10	7	11	5	13
Coimbatore Town.	Rainfall .. In.	3·86	2·11	3·35	0·82	1·50	0·92	4·37
	Number of days upon which rain fell.	7	7	7	4	5	4	9
Average for Coimbatore ..		1·69	2·51	1·77	1·36	1·08	1·56	6·13

Locality.		November.	December.	January.	February.	March.	Total.
		9	10	11	12	13	14
Agricultural College.	Rainfall .. In.	3·48	2·49	0·46	0·57	0·61	25·54
	Number of days upon which rain fell.	9	6	2	4	2	87
Coimbatore Town.	Rainfall .. In.	3·34	2·66	2·34	0·65	1·24	27·68
	Number of days upon which rain fell.	7	6	3	3	2	64
Average for Coimbatore ..		3·50	1·02	0·41	0·38	0·46	21·87

At a station situated as this is, only six miles from the foot of the hills, the rainfall is very erratic; numerous instances have occurred of heavy rain on one side of the farm with very little on the other.

Buildings.—The farm buildings were taken over from the Public Works Department at the end of July. They consist of two ranges of cattle-stalls having hard floors and drains and one range of cattle-boxes, in which the cattle stand upon the accumulated bedding refuse. These cattlesheds are protected from the south-west wind by an L-shaped range of grain-stores, godowns and implement-shed. To the east of the cattle-byres, there is a range of buildings suitable for machinery, such as cotton-gins, oil-mills, etc. Carpenter's and Blacksmith's shops are also provided.

Covered manure-pits are provided to receive the solid and liquid excreta and litter from the two byres.

Implements.—It has been found that, upon the greater part of the soils of the farm and, especially, upon those which have been improved by "silting", a wooden plough is more useful than an iron one for the reason that the soil, when in an excellent condition for working into a tilth with the country plough, is sufficiently moist to stick together and to clog on the mould board and share of the iron plough in such a manner as to render the mould board almost inoperative. Iron ploughs, however, if strong, are particularly useful in entering and breaking up the land from which a crop has just been harvested or which has become dry. Attempts are made to have all the fields on the Farm which are of sufficient size ploughed deeply with an iron plough at least once a year. The working down of the rough-ploughed field will then be done by country ploughs after a rain.

Two Martin's cultivators have been received from the Director of Agriculture and have been found to do good work in stirring a field deeply after it has been ploughed. The land bakes too hard for this tool to be used in the hot weather for breaking up the surface. When working under suitable conditions, however, they have excited considerable interest among ryots who have visited the Farm.

The winnowing machines are found extremely useful and are the cause of much comment from passers-by. A trial was made of the method of threshing by means of a stone roller drawn in a circle by means of a pair of bullocks. For varieties of grain, such as white cholam, which readily separate from the glumes, it is particularly useful as one pair of bullocks do the work instead of four. The roller used was found to be somewhat too heavy and further experiments will be made with a lighter one.

A portable combined oil engine and 3″ centrifugal pump have been received and will be put into work as soon as possible.

As far as possible, all crops are sown with the gorru and interculture done with dhanthalu.

Cattle.—The working bullocks are chiefly of the Kangayam breed, with a few of the Alambadi hill breed. There are five cows of a mixed Nellore breed which have been transferred from the old College of Agriculture at Saidapet. These cows are good milkers but, for working cattle, it was thought more desirable to attempt to breed a few pure Kangayam cattle as this breed is the best in the district. To this end, four cows and a young bull have been purchased from one of the chief breeders in the Kangayam country.

Crops.—The crops grown were those usually found in the locality and very few attempts have been made to grow a crop foreign to the district. Attention was paid to methods of cultivation rather than to obtaining results with a liberal application of manure. With the exception of nitrate of soda, no artificial or rather concentrated manures have been used. It is considered that more useful impression will be made upon the minds of the ryot-visitors if good results are obtained with ordinary manures than if these results are obtained with substances so costly as to be practically beyond their means.

Paddy.—Experiments upon this crop were made to ascertain the effect of transplanting seedlings singly instead of the more usual practice of transplanting them 10 to 20 at one time. The question of the economical supply of green leaves as manure also received attention.

Spacing and transplanting experiment.—The piece of land selected was so situated that each experimental plot took water directly from a field irrigation channel and discharged into a drain independently of the rest. This would tend to eliminate the differences which might be due to the richer, *i.e.*, more silt-laden, water received by the upper field of a series irrigated from field to field. The plots, with the exception of the unmanured plots, were all given a dressing of five cartloads of Kolinji (*Tephrosia purpurea*) leaves and stems per acre. An unmanured plot was arranged at the top and at the bottom of the series. No especial attention was given to the irrigation and general cultivation of these fields, local practice being followed. The variety employed was chinna samba, a rather fine-grained paddy and one with a considerable local reputation. Before giving the results, it may be as well to give an account of the local system of transplantation and seed-rate. Seed is sown at the rate of 250 measures of 288 tolas weight per acre of seed-bed. One acre of seed-bed is considered sufficient to transplant 16⅔ acres. When about 40 days old, the young plants are transplanted, 20 women being required to plant one acre a day. The seedlings are rapidly pressed into the puddled soil, approximately in rows and about five inches apart in the row; sometimes one, sometimes two or three, sometimes up to six or eight at a time, according to the size of the seedlings. The planter apparently determines the quantity by the feel of the seedlings as she picks them out of the bundle in her left hand; consequently, if they are well developed, she only takes two or three but, if poorly developed, any number up to about ten, depending upon the thickness of the young plants. It will be thus seen that the local custom is not particularly wasteful of seedlings and therefore "single-planting" does not show to the advantage it would do in some other districts. In our experiments, the seedlings were all transplanted on the same day and were 30 days old. In spacing, it was considered useless to expect a woman to measure the distance between seedlings with a piece of stick cut to a definite length; therefore, two natural measures of distance were adopted—(*a*) the width of the hand with the fingers closed, (*b*) the full span with fingers spread open. Of course, this distance will vary somewhat with individual planters but its practical convenience far outweighs any advantages obtained with pieces of stick cut to dead length. It was found that twelve women were required to transplant one acre per day on account of the time taken in getting either single or a definite number of seedlings and in spacing them out.

The results for this year are somewhat erratic owing possibly to differences in the condition of the plots. The experiments will be repeated next year on the same piece of land with the same manure, but the order of the plots altered so that a plot planted closely this year will be planted widely next year.

FINAL results of method plots—Variety tried—Chinna samba.

Number of series of plots.	Method adopted in transplanting.	Area in cents.	Weight of grain in lbs.	Weight of straw in lbs.	Acre average in lbs.		Remarks.
					Grain.	Straw.	
1	2	3	4	5	6	7	8
A-1 ..	Local method ..	13	503	620	3,869	4,769	Series A-2 and A-18 are no-manure plots.
A-2 ..	Do. ..	9	274	408	3,044	4,533	
A-3 ..	Do. ..	15	509	728	3,393	4,853	The rest were manured with Kolingi leaves at the rate of 3,000 lbs. per acre.
A-4 ..	Do. ..	15	511	728	3,406	4,853	
A-5 ..	Local single ..	16	486	608	3,037	3,800	
A-6 ..	Do. ..	10	334	373	3,340	3,730	
A-7 ..	Local twos ..	16	536	760	3,350	4,750	Local method— Number of seedling 4 to 10. Spacing 4" to 7".
A-8 ..	Singles, 3" apart ..	12	366	444	3,050	3,700	
A-9 ..	Singles, 9" apart ..	17	553	636	3,253	3,741	
A-10 ..	Do. ..	13	335	388	2,577	2,985	For the local method plots, seedlings were raised with 30 local measures per acre: for the other plots at 4 measures per acre.
A-11 ..	Do. ..	21	752	912	3,581	4,343	
A-12 ..	Do. ..	11	349	420	3,173	3,818	
A-13 ..	Twos, 9" apart ..	19	720	815	3,789	4,289	
A-14 ..	Do. ..	17	512	564	3,012	2,965	
A-15 ..	Threes, 9" apart ..	22	772	815	3,509	3,705	
A-16 ..	Local method ..	20	557	848	2,785	4,240	
A-17 ..	Do. ..	25	695	716	2,780	2,864	
A-18 ..	Do. ..	18	334	448	1,856	2,489	

A striking feature is the exceedingly high yield of field No. A-1, local method. This can be however explained by the fact that this field is at the top of the series and is the one which in former years had received water directly from the channel. In the no-manure plots, plot A-2 was likewise at the top of the plot and A-18 is at the bottom. Considerable difference will be observed in the yield of these two plots, and part at least of this difference may be set down to the effect of previous years' silting from channel water.

Green manuring.—Since green leaves and twigs of plants are used in large quantities for manuring paddy lands and are often brought from great distance at considerable expense, experiments were made to ascertain whether it was possible to utilise the bare paddy lands themselves during the dry season to grow leguminous crops which could be ploughed in at the beginning of the cultivation season. Two acres of land were sown broadcast with horsegram, as soon as the land was moderately dry after harvest. A ploughing was given to break up the crust and another cross ploughing to cover the seed. The growth was slow during February and March, but with the advent of the kar-rains, the plants recovered, and an excellent crop of green stuff was obtained so much so that sufficient was obtained to manure a third acre. The crop was trodden in in puddle after ploughing also in puddle.

Comparison is made with fields manured with Erukkum (*Calotropis gigantea*).

Yields in lbs. per acre—

—	A.		B.		C.	
Variety.	Horsegram grown on spot.		Horsegram brought from A.		Ordinary leaves.	
	GRAIN.	STRAW.	GRAIN.	STRAW.	GRAIN.	STRAW.
Sadai samba	3,060	3,006	3,230	3,624	2,466	2,380

It will thus be seen that the result was quite satisfactory, especially from the economic point of view: because the expense of bringing the ordinary green leaves from a great distance was avoided. Although it appears more advantageous to grow the horsegram elsewhere than to grow it on the spot, this result may possibly be due to certain peculiarities in the soil. The advantage of the horsegram over the non-leguminous erukkum leaves is most marked in both cases.

Cholam. (*Andropogon sorghum*).—An attempt was made to grow irrigated summer cholam in rows and to irrigate the crop by means of furrows between the rows, instead of the usual method of making small flat beds, since it seemed that considerable waste of water from evaporation occurred in the latter case, owing to the large area of moist soil exposed to the sun. It was, however, found very difficult to get the land into a sufficiently fine tilth for sowing with a gorru (country drill) and also the men were not able to drill with sufficient accuracy. The results therefore are not satisfactory as far as yields are concerned: but it was found that less water was required when the crop was irrigated in furrows and experiments are about to be undertaken to test this point quantitatively.

Cotton.—A portion of the land was ploughed during the hot weather with Massey's cotton soil plough, which breaks up the land to a depth of 9 or 10 inches and leaves it in such a rough condition that it will readily hold any rain water falling upon it. In March the effect of this could be readily seen in the more green appearance of the crop, compared with that on land worked with the country plough only. Most of the cotton was sown with the gorru (country drill) and hoed with the dantha (bullock-hoe); but a stretch, one chain wide, across the field was sown and worked in the local manner for comparative purposes. Little difference could be discovered in the appearance of the growing crops, and any superiority in the drilled crop for this soil must be manifested in improved yield.

Mixtures of cotton and thenai and cotton and horsegram were grown as well as pure cotton.

At the time of writing, the cotton harvest is just beginning and results must be deferred to the next report.

Ragi. (*Eleusine coracana.*)—This was grown under irrigation upon the ridge system and, owing to the fact that the ragi is transplanted, the method is perfectly satisfactory. Unfortunately, however, the field set apart for a comparative test of the two methods was badly attacked by a stem borer and the crop practically destroyed. Hence, no comparative results can be given. The same economy of water was noticed as in the case of cholam.

Sugarcane.—A series of six plots was set out as a variety test and for the purpose of affording material for distribution, if cultivators desired to test any of the Mauritius canes. The varieties were Puvan, white Namam (striped), Red Mauritius, Striped Mauritius and Ashy Mauritius. The three Mauritius canes were received from Samalkota and Palur and the other three were local. The land selected turned out to be somewhat alkaline and the well commanding the field gave water decidedly rich in salts; thus the conditions were not very suitable for the production of a heavy crop of cane. The Namam cane occupied the plot nearest the more alkaline portion of the field and was a total failure; its growth was insignificant from the very beginning. Ashy Mauritius gave promise of being the best of the lot; it tillered remarkably well and, although planted very thinly, looked like giving a good yield. When eight months old, however, it began to flower and from that time was surpassed by others. Red Mauritius tillered more freely than the others; and provided the canes grow to a good length as would probably be the case in wet land, the seed rate of 7,500 per acre would be quite sufficient for a good crop. No flowers were observed on this variety.

Striped Mauritius cane was not remarkable in any way during its growth. Several "sports" were observed, the products being ashy coloured and white with faint reddish markings (ivory).

The area of each plot was 30 cents, the manure applied was neem cake 1,600 lbs. per acre in two applications. The canes were planted at the rate of 7,500 per acre in trenches arranged perfectly level so as to hold irrigation water. As soon as the canes were about one foot high, the ridges between the rows were split and a trench formed between each two rows of cane. This arrangement was found to afford an ample means of irrigation. Harvest operations were about to commence at the date of this report and statistics regarding yield must be deferred to next season.

Ground-nut.—This crop was grown on the most sandy piece of land on the farm, which for six months had been allowed to be waste. When the land became softened by the kar rains, it was thoroughly well ploughed and cleaned and was sown with horsegram which was ploughed in, before the sowing of the ground-nuts. The idea was to ascertain whether ground-nuts would grow without irrigation with the conditions as to rainfall, which prevail at Coimbatore during October and November, and at the same time to have the crop under observation. The varieties sown were received from Palur Agricultural Station and were "Local" Mauritius and small Japanese, only a very small quantity of the latter being sown. They were sown on 12th August in rows about one foot apart by women who dropped them into the furrow made by a country plough. A second plough then came along and covered them up. The ploughmen were able to go perfectly straight and the distance between the rows was quite uniform. A small portion was sown in rows 18 inches apart and another portion was ridged up and the seeds dibbled on the tops of the ridges. The results of these modifications were unsatisfactory. If the seed is sown as much as 18 inches apart it is too long before the land is covered by the plant, and weeds become troublesome, and that sown on ridges has no support for the spreading branches. After the seed was sown, a period of dry weather set in, but the water in the soil was sufficient to cause good germination and early growth. Later on, however, the plants came to a standstill and the leaves wilted every day when the sun became powerful, recovering themselves in the night. As soon as the north-east rains set in, the crop made excellent growth and was harvested at the end of December.

The Japanese ground-nut is a variety whose branches have an ascending habit, instead of creeping along the ground. A large number of stalks of nuts were observed descending from the upper portion of the branches to the ground. Some were quite six inches long. It appears therefore that this variety might be tried at the *bottom* of a trench, the sides of which would afford a refuge for these developing nuts with a corresponding increase in the yield of the crop. Experiments upon this point will be undertaken next season.

The harvesting of ground-nut is an expensive operation if performed by crow-barring up the land. It was therefore decided to try the effect of drawing a broad share underneath the crop and so loosening the soil from which the nuts would then readily separate without being torn off the plants. The plants then being gathered into heaps are readily picked over by women. Such a share is provided with Martin's cultivators, one pair of bullocks being found quite sufficient to pull the implement.

Pulimanji or Gogu (*Hibiscus cannabinus*).—This crop was grown again as a field crop in the north-east monsoon, in order to ascertain whether the rainfall would be sufficient for the growth of a fair crop. The seed was sown on 16th October and harvest took place on 6th, 7th and 8th March. Four waterings were necessary—one in December, two in January and one in February; but in the earlier stages the rainfall was sufficient. Where the land was in good condition, one side of the field being inclined to be alkaline, the plants grew to a height of 6 to 9 feet. The plants were retted in small quantities at a time to economise water. Four retting pits were dug, each about 10 feet long and 6 feet wide. When sufficiently retted the separated fibre was washed in the water flowing along an irrigation channel leading from a well. This method ensures a continuous supply of clean water without waste or extra expense for lifting.

Figures for the yield of fibre cannot be given as the whole of the crop is not yet retted.

Jute.—A portion of the same field which was under gogu was sown with jute at the same time and treated as far as possible similarly; but the crop, as far as fibre was concerned, was a failure—the plants only grew to a height of about 4 feet.

For growing in places where there is not abundant water or rain, gogu seems to be the more satisfactory fibre plant of the two.

Manurial experiments.—With one exception, no experiments with concentrated manures were made, as attention was paid more to methods of cultivation. It having been suggested that nitrate of soda should be tried as a manure, a quantity was obtained. As locally the unirrigated black soil never receives manure, it was thought that the results of a top dressing of nitrate would be well shown on such soil. With this idea, therefore, a stretch of land, one chain wide, was marked off on the cotton fields at right angles to the general line of cultivation and dressed with one cwt. of nitrate per acre on 16th November. The conditions were very favourable, as the land was moist and rain fell slightly two days after it was sown. The result was negative—not the slightest difference in the appearance of the cottons treated and untreated

could be detected. Part of the land included mixed cotton and thenai. Here again, there was no effect. This result is of considerable interest, in view of the fact that on chemical analysis these soils are found to contain very little nitrogen.

The cottons of the treated portion are being collected separately in order to ascertain whether the yield is affected.

Ensilage.—In November 1906, two plain earth silos were excavated and filled with fodder cholam and cumbu chopped by hand into pieces about six inches long. The silos were circular and were 21 feet in diameter by 10 feet deep and 27 feet in diameter by 10 feet deep, respectively. They were opened for use in May 1907. A small quantity at the top was rejected, but the main quantity was quite good and sweet; and after a day or so readily eaten by the farm bullocks.

Number of bullocks fed per day	60
Total number of days the fodder lasted	49
Total weight of ensilage removed	64 tons.

It was given mixed with dry cholam straw. The value of the ensilage was not so apparent last season as it might have been, because of the exceptionally heavy kar rains causing a plentiful supply of grass, which can be obtained for two annas a headload. This year the experiments have been repeated; the silos, however, have been made rectangular, each 30 feet long, 12 feet wide and 6 feet deep. They were filled with fodder cholam; in one case cut into small pieces and in the other case the cholam was put in without cutting, as the time occupied in cutting was too great.

The results of the experiment will be inserted in the next report as the pits have not yet been opened.

COIMBATORE,
6th May 1908.

C. J. W. SHEPPERSON,
Principal of the Agricultural College and Research Institute and Superintendent of the Central Farm, Coimbatore.

MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES.

IRRIGATION PUMPING DEPARTMENT.

At the beginning of the year the total number of oil-engines and pumps at work or in course of erection was 54 and, during the year, I have received information regarding the installation of 40 new engines, nearly all of them having been put down in accordance with plans drawn up in this office. This makes the total number of engines on our list which are, or will shortly be, pumping water for irrigation 94, aggregating 640 B.H.P. and driving pumps, the combined discharge of which is $2\frac{1}{2}$ million gallons per hour. The duty of water under these pumps is not less than 150 acres per cubic foot per second and, assuming that the pumps work on an average 8 hours a day, the area under irrigation will amount to about 5,000 acres. The whole of this area is either double cropped or devoted to garden crops and without doubt will yield a gross return of more than Rs. 100 per acre per annum. At this low figure the annual value of the produce due to irrigation by pumping by private installations amounts to 5 lakhs of rupees. This is only a rough estimate and does not pretend to any great degree of accuracy and is only put forward to give some idea of the gradually growing importance of this method of irrigation. The following list gives the names of the owners and details regarding the new installations:—

1. A 9-h.p. engine and 4″ pump for M.R.Ry. S. Panduranga Mudaliar, Cuddalore, South Arcot district.
2. A 6-h.p. engine and 4″ pump at Koliyanur, South Arcot district, for M.R.Ry. Rama Reddi.
3. A $7\frac{1}{2}$-h.p. engine and 4″ pump at Kalinjikuppam, South Arcot district, for M.R.Ry. V. Desikacharriar.
4. A $7\frac{1}{2}$-h.p. engine and 4″ pump at Karumampakam, South Arcot district, for M.R.Ry. Ranga Reddi.
5. A $7\frac{1}{2}$-h.p. engine and 4″ pump at Nellikuppam, South Arcot district, for M.R.Ry. Appavoo Padaiachy.
6. A 6-h.p. engine and 4″ pump at Anichampaliem, South Arcot district, for M.R.Ry. Nallambala Chetty.
7. A $7\frac{1}{2}$-h.p. engine and 5″ pump at Ariyalur, South Arcot district, for M.R.Ry. V. Rangacharriar.

8. A 7½-h.p. engine and 5″ pump at Melrajankuppam, South Arcot district, for M.R.Ry. N. Raghavachari.

9. A 9-h.p. engine and 4″ pump at Anathur, South Arcot district, for M.R.Ry. Saba pathi Pillai.

10. A 10½-h.p. engine and 6″ pump at Malligrampattu, South Arcot, for M.R.Ry. J. Dorasawmi Reddiar.

11. A 6½-h.p. engine and 3″ pump at Siruvanur, South Arcot, for M.R.Ry. Dorai Raju Mudaliar.

12. A 10½-h.p. engine and 5″ pump at Kavanipakam, South Arcot, for M.R.Ry. Seetharam Reddiar.

13. A 7¼-h.p. engine and 4″ pump at Arigilavadi, North Arcot, for M.R.Ry. Venkatasubba Reddiar.

14. A 12-h.p. engine and 5″ pump at Gudiyáttam, North Arcot district, for M.R.Ry. M. Govindasawmi Nayudu.

15. A 7½-h.p. and 4″ pump at Mangaducherri, North Arcot district, for M.R.Ry. N. Krishna Rao.

16. A 7½-h.p. engine and 4″ pump at Walajah, North Arcot district, for M.R.Ry. M. Muniswami Reddiar.

17. A 7½-h.p. engine and 3″ pump at Kálahasti, North Arcot district, for Raja P. Rama Rayaningar, M.A.

18. A 10¼-h.p. engine at Arni, North Arcot district, for the Jagirdar of Arni.

19. A 5-h.p. engine and 3″ pump at Nallur (near Wandiwash), North Arcot district, for M.R.Ry. N. Govinda Reddi.

20. A 7½-h.p. engine at Ramaiyapatnam, Nellore district, for Mr. Dastagiri Sahib.

21. A 9-h.p. engine and 6″ pump at Achialpuram, Trichinopoly district, for M.R.Ry. Subbaroya Pillai.

22. A 10½-h.p. engine and 4″ pump at Palathur, Anantapur district, for M.R.Ry. Venkataramanappa.

23. A 10½-h.p. engine and 3″ pump at Palathur, Anantapur district, for M.R.Ry. P. Kurugodappa.

24. A 6-h.p. engine and 3″ pump at Anamalai, Coimbatore district, for M.R.Ry. V. Chikka Naicker.

25. A 7½-h.p. engine and 4″ pump at Ravanasamudram, Tinnevelly district, for M.R.Ry. R. Sivarama Aiyar.

26 & 27. Two 12-h.p. engines and two 10″ pumps at Mangalagiri, Kistna district, for the Atmakur Lift Irrigation Company, Limited.

28. A 16-h.p. engine at Gudiváda, Kistna district, for M.R.Ry. V. Seshayya.

29. A 5-h.p. engine and 3″ pump at Alinjivakam, Chingleput district, for the Zamindarni of Alinjivakam.

30. A 6-h.p. engine and 4″ pump at Orakkadu, Chingleput district, for the Zamindar of Orakkadu.

31. A 6-h.p. engine and 4″ pump at Punjetti, Chingleput district, for M.R.Ry. Appavoo Mudaliar.

32. A 7½-h.p. engine and 4″ pump at Kaliyanur, Tiruvallúr taluk, Chingleput district, for M.R.Ry. Seetharam Nayudu.

33. A 7½-h.p. engine and 4″ pump at Manjankaranai, Chingleput district, for M.R.Ry. Ramakrishna Nayudu.

34. A 3½-h.p. engine at Surapet, Chingleput district, for Messrs. T. R. Tawker & Sons, Madras.

35. A 7½-h.p. engine and 4″ pump at Surapet, Chingleput district, for Messrs. T. R. Tawker & Sons, Madras.

36. A 6-h.p. engine and 4″ pump at Government Farm, Hagari, Bellary district.

37. A 7½-h.p. engine at Mannadipet, South Arcot district, for M.R.Ry. Viswanatha Reddi.

38. A 7½-h.p. engine and 4″ pump at Veermachampetti, Trichinopoly district, for M.R.Ry. Rama Aiyar.

39. A 9-h.p. engine and 5″ pump at Anamalai, Coimbatore district, for M.R.Ry. L. Subbaraya Mudali.

40. A 32-h.p. gas engine and suction gas producer plant and 10″ pump for the Gunjana Project, Cuddapah district.

2. Agricultural loans to the extent of Rs. 22,000 were granted to the following applicants during the year and there are still a large number of applications for such loans pending :—

List of loans sanctioned from 1st April 1907 to 1st May 1908.

			Rs.
1.	M.R.Ry.	Chikka Naicker of Anamalai, Coimbatore district ...	2,500
2.	,,	Ratnasabapathi Mudaliar, Tondiarpet, Madras ...	2,500
3.	,,	Appavoo Padaiachi, Nellikuppam, South Arcot district	3,000
4.	,,	V. Desikachari, Tiruvendipuram, South Arcot district ...	3,000
5.	Zamindarni of Alinjivakam, Chingleput district		1,500
6.	M.R.Ry.	Rama Aiyar of Virâmachampatti, Trichinopoly district...	4,000
7.	,,	Paramasiva Gounden, Vadakariattur, Trichinopoly district	500
8.	,,	L. Subbaraya Mudaliar of Anamalai, Coimbatore ...	5,000
		Total ...	22,000

3. The bulk of the engines and pumps have been purchased from Messrs. Massey & Co. on the hire-purchase system, the terms of payment usually being one-fourth of the cost when the agreement is signed and three subsequent instalments of one-fourth of the cost at intervals of six months, interest being charged on the balance due at the rate of 8 per cent. per annum.

4. The centre in which oil-engine irrigation is most rapidly developing is the South Arcot district where there are now 33 engines and pumps at work. The reason of this is that the soil is fertile and there is a very abundant supply of water in beds of coarse sand lying from 10 to 15 feet below the surface of the ground. To the north of Madras the boring operations in the Ponnéri and Tiruvallúr taluks have revealed extensive supplies of sub-artesian water, and within the last three months five engines and pumps have been purchased by local ryots in addition to three engines and pumps already installed by Mr. Gopinatha Tawker in Surapet. In previous reports and in a number of papers which I have written upon the advantages of this method of irrigation I have dealt with most of the questions connected with this work, and it is unnecessary to unduly lengthen this report by going over the same ground again. I append, however, a copy of the paper on "Lift Irrigation", which was contributed to the Industrial Conference held at Surat in December 1907, as it contains a fairly full statement of the present position.

5. From the facts stated above it will be seen that irrigation with water lifted by oil-engines and pumps is making steady progress and this is sufficient evidence that the same is profitable. It is very difficult to get any reliable information regarding actual profits, and on this point I am only able to submit conclusions based on general observations and on the reports of my subordinates. In a few cases the installations have been badly managed or from unavoidable causes crops have suffered injury, with the result that the working has entailed a loss or very little profit, but in most cases the returns have been excellent and it would probably be an underestimate to place the net profit at 25 per cent. per annum on the capital invested in the installations and in the improvement of the lands The high prices at present prevailing have placed the ryots in a very enviable position, and as the cost of labour and cattle have risen proportionately they are beginning to appreciate the advantages offered by these powerful labour-saving devices. In those tracts where water is abundant it is the smallness of the holdings and the lack of capital that delay the adoption of irrigation by pumping. There is no longer any doubt about the advantages of this way of lifting water. The ryot is not afraid of the oil-engine and I think it may be fairly said that those who are able to purchase them are envied by their neighbours instead of derided by them as was invariably the case two years ago. Only one case has so far come to my notice where a number of ryots have joined together to purchase an oil-engine and pump, but I am of opinion that it will not long be singular and I have instructed the Supervisors to render all possible assistance and to do what they can to initiate co-operative working in this direction. In one instance a Lift Irrigation Company has been formed with a capital of Rs. 12,000 to install a pumping station on the banks of the Kistna Western Delta Main Canal to irrigate 500 acres of land too high to be commanded by direct flow. The average lift will be about 8 feet and the maximum lift 10 feet. Two 12-h.p. engines and two 10″ pumps are now being erected and irrigation will commence in July. It is desirable to encourage such experiments as it may be fairly assumed that when the water has to be pumped it will be used with economy and the data from these pumping stations should be useful in ascertaining what duty of water is most profitable.

6. It is well known that the duty of water ranges between rather wide limits, but there is no information of any value to show what is the duty of water which yields the best results. It was thought that the establishment of the Experimental Pumping Department would lead to the collection of a good deal of information on this point, but so far very little has been gathered, and there seems little prospect that in the immediate future the Pumping Department will be able to do much, as the staff is fully occupied in extending the sphere of operations.

7. *Government installations.*—The first experiment with an oil-engine and pump was made at Melrosapuram six years ago and the Rev. Mr. Andrew, who is still in charge of the Settlement, reports that during the last year the engine ran for 1,005 hours and raised 1,870,000 cubic feet on an average height of 23 feet. The area under cultivation was 17·66 acres which yielded crops worth Rs. 1,691. The cost of running the engine was Rs. 303–10–0 to which may be added another Rs. 300 for interest and depreciation.

Of the other installations, that at Panampet which was lent to Messrs. Parry & Co. for two years has now been handed over from the 1st of January to the munsif of the village for a period of three years, the man having deposited a sum of Rs. 1,000 as security for the maintenance of the same in good order. The water-supply is good, but the soil in the immediate neighbourhood of the well is very sandy. The ryots in the village purchase water from the munsif at a fixed rate per hour for the whole of the supply from the engine, and careful accounts are being kept to ascertain whether this system of working is profitable and whether it is desirable to encourage it. A second installation is at Madura in charge of the District Agricultural Association, a third is at Kadiampatti with the Rev. Mr. Anderson, a fourth is at the Government Farm, Saidapet, whilst a fifth has been temporarily lent to several people for preliminary work in putting down larger installations. These engines and pumps have served their original purpose well and they are all still at work. It has been impracticable this year on account of the pressure of more important work to scrutinize the detailed information regarding them which has been recorded, but it will be done later on and any information of value will be published in the Scientific Report.

8. The working of the engines and pumps used by the Agricultural Department appears to have been satisfactory as no complaints have been made. At the Hagari Experimental Farm I have had a Supervisor stationed during the greater part of the year completing the erection of the farm buildings and studying the water-supply question. From the time the freshes first come down the river till the beginning of the hot weather there is no difficulty with the water-supply, but the well sunk in the padugai land adjacent to the pumping station yields scarcely more than one-tenth of the quantity which it was calculated would be derived by this means from the sand of the Hagari river. This is due to the exhaustion of the water in the cone of sand round the well. Once the water is drawn off no further supply can be obtained till either local rainfall occurs or a flood passes down the river. As explained in the scientific report of last year the only way to get a large supply of water at the Hagari farm in the hot weather will be to put up a number of small pumping plants at some distance from one another so as to draw the water from a larger mass of sand.

9. *Gunjana installation.*—This pumping project, which was started in the Public Works Department, was sanctioned in G.O., No. 1793, Revenue, dated 17th July 1907, and has been handed over to this department to be carried out. At the end of the year no work had been done on the site, but the plans have been finally revised and the engine and pump ordered from England. This plant will be noteworthy as being the first pumping station in which a suction gas producer plant will be at work. The engine, which is of the Crossley type, is 32 B.H.P. and will drive a 10″ centrifugal pump to irrigate 500 acres of land which is at present chiefly devoted to the growing of turmeric. The working of the installation will be conducted on the same lines as a minor Government irrigation work, the idea being that the ryots should be charged the actual cost of lifting the water they use. This charge, of course, includes an allowance for interest and depreciation.

10. The establishment employed in the Irrigation Pumping Department consisted of one Sub-Engineer, four Supervisors and one Overseer. Practically the whole of the time of the Supervisors was devoted to pumping work, but the Sub-Engineer Mr. Rajagopalswami Mudaliar was employed for a considerable part of time on other work, chiefly the reconstruction of the Tannery at Sembiam and the erection of the new machinery and plant. The Overseer worked under the Deputy Collector and was employed the whole of the time in the Pouneri taluk and the valuable nature of the work done there testifies to his practical knowledge and skill in boring.

11. The expenditure in the Pumping Department amounted to Rs. 16,353–1–6, of which Rs. 12,800–5–4 was on account of the pay and travelling allowances of the establishment. From the time the experiments first began up to the 31st March 1908, the total expenditure on experiments in pumping with oil-engines and in the development of the same has amounted to Rs. 95,491–12–6. Against this sum there are assets which will probably realise from Rupees 15,000 to Rs. 20,000, so that the net cost of introducing oil-engine irrigation in this Presidency may be taken as not less than three-quarters of a lakh.

12. So far all the work has been done free of charge to the landholders concerned, but the time has now arrived when some portion of this expense may be fairly borne by those who avail themselves of the assistance of the Pumping Department. At first it will not be wise to charge fees covering more than a small part of the cost of the work, lest such charges should unduly retard progress. The fact that Government have constituted a special department for the development of this irrigation and have so far made no charges to those who have benefited by it, has undoubtedly engendered the suspicion in the minds of many ryots that there is some sinister ulterior motive behind it. The imposition of fees will therefore help to dispel this

illusion. It will probably lead to some attempting to do the work on their own account to avoid paying fees, but it is equally certain that these enterprising individuals will make a mess of it and finally seek the assistance of the department to extricate them from their difficulties. This will be an object lesson not without considerable value to the country, as the sooner the people learn that it is extremely unwise to invest money without the advice of competent and disinterested Engineers the better it will be for them.

13. Towards the end of 1906 a Deputy Collector was placed on special duty to assist the ryots of the Tiruvállúr and Ponneri taluks of the Chingleput district in sinking wells. The idea was to develop well irrigation by granting loans under the Agricultural Improvement Loans Act and to prevent waste of money by a preliminary exploration of the ground with boring tools. At first the scheme was not very successful, but when it was modified to include the improvement of existing wells very satisfactory results were obtained. The sub-artesian water, which had previously been discovered in the village of Surapet to the south of the Kortaliyar river, was found to extend over a large tract of country in the Ponneri taluk to the east of the Main Trunk road. The work was in the immediate charge of the special Deputy Collector till the end of 1907, when he was transferred to the Coimbatore district, and I took over the detailed control of the boring operations, placing one of my Supervisors in charge of the same. The work was then extended into the Tiruvallúr taluk and the results of the first four months working in that taluk indicate that there also considerable bodies of underground water under pressure exist. As already mentioned a beginning has been made to utilize these valuable sources of water-supply by the installation of five engines and pumps, and, doubtless, as time goes on, the number will steadily increase. The exploratory work, however, is mainly intended in the first instance to open out new sources of water-supply which the ryots can utilize with the means at present at their disposal. Many wells which formerly dried up in the hot weather owing to the failure of the surface sub-soil water now yield an abundant supply of water which rises into them through pipes which penetrate the impervious layer of clay overlying the water-bearing sands. The conditions are somewhat similar to those which prevail in the United Provinces but with this important difference that the water-bearing sands are very coarse and yield a much larger supply of water without any risk of the well being filled with sand. It is at present impossible to say what quantity of water is available, or what is the largest quantity that can be drawn off at any one point, as so far the ryots have not been able to make use of more than a small fraction of the water-supply which has been placed at their disposal. It is only at Surapet that any data bearing on this point have so far been obtained. The static water-level is generally from 12 to 16 feet below the surface of the ground and the inflow to the wells depends upon the diameter of the pipe connecting the well with the water-bearing sands and upon the extent the water-level in the well is lowered below the static level. In one well at Surapet with a head of about 9 feet 700 gallons per minute can be continuously obtained through two 7″ pipes sunk close together. A Venturi Meter has been fixed at this installation and from time to time tests are made to determine whether there is any material variation in the flow. So far no indications of a decreased supply have been observed, but it is possible that later on the pressure may decrease somewhat and the vertical height through which the water has to be lifted will increase. In another instance also at Surapet a 4″ pipe sunk through the bed of an old tank yields a sufficient supply of water to keep a 4″ pump going. The volume in the case cannot be accurately estimated as part of the water is due to percolation from the sub-soil. The supply is sufficient for the engine and pump, but if more water were required it would be easy to increase the volume by putting down a larger tube.

14. In the previous quarterly reports of the Deputy Collector, the latest of which deals with the work done up to the end of December last year, the information regarding the borings is given in tabular form, and I submit a modified tabular statement bringing the information up to the end of the year under review.

TABLE I.

Total number of borings, 259	Fresh wells, 106	Sub-artesian	38
		Percolation water	16
		Failed	52
	Existing wells, 153	Sub-artesian	74
		Percolation water	2
		Failed	77

From this statement it will be seen that in all 259 borings have been made of a total length of 8,845 feet. Of these 74 borings have disclosed the certain existence of sub-artesian water, 38 the probable existence of the same and 18, while failing in this respect, have penetrated beds of coarse sand from which fair supplies of water can be derived by ordinary surface wells. One hundred and twenty nine or one-half of the borings proved a failure, and these naturally included those which penetrated to the greatest depth, as the work was carried on in the hope that by its continuance success might result. The average depth from the surface of the ground of the borings in wells when sub-artesian water-bearing sand was reached was 42·5 feet, whilst when the work was started from the ground the depth was only 35·2 feet.

15. From the beginning records have been kept showing the strata passed through by each boring, but unfortunately owing to the lack of education on the part of boring maistries these sections are not very reliable, and it is doubtful in many cases whether the actual depth of the water-bearing sand below the surface of the ground has been accurately recorded. It is nevertheless of great importance to endeavour to ascertain the general level at which these sands exist and to ascertain with the smallest possible amount of boring the absence of these sands.

Table II

Showing depths in feet at which the sub-artesian supply was tapped in wells.

21 to 30 ft.		31 to 40 ft.		41 to 50 ft.		51 to 60 ft.		61 to 70 ft.		71 to 80 ft.		81 to 90 ft.		91 to 100 ft.	
No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.
1	24	4	31	1	41	2	51	1	62	1	73	...	...	1	96
1	25	3	32	5	42	3	52	...	...	...	...	...	...	...	...
3	26	1	33	3	43	2	53	...	...	...	...	...	...	...	...
1	28	4	34	1	44	1	54	...	...	...	...	...	...	...	...
...	...	2	35	2	45	2	55	...	...	...	...	...	...	...	...
...	...	4	36	1	46	2	57	...	...	...	...	...	...	...	...
...	...	5	37	3	47	1	59	...	...	...	...	...	...	...	...
...	...	2	38	1	48	...	...	...	...	...	...	...	...	...	...
...	...	2	39	3	49	...	...	...	...	...	...	...	...	...	...
...	...	3	40	2	50	...	...	...	...	...	...	...	...	...	...

In Table II is recorded the depth from the surface of the ground at which each successful boring from the bottom of a well reached the water-bearing sand. From this table it will be seen that in the great majority of cases borings under 50 feet in depth struck the water and that there were only three borings over 60 feet in depth which were successful and of these two were in the Tiruvallúr taluk nearly 40 miles from the coast.

Table III

Showing borings from the surface which probably tapped sub-artesian water.

21 to 30 ft.		31 to 40 ft.		41 to 50 ft.		51 to 60 ft.	
No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.
1	24	2	31	1	42	1	54
3	25	1	32	2	43	...	...
1	26	3	34	1	44	...	...
3	27	1	33	2	48	...	...
2	28	2	35	1	49	...	...
1	29	1	36	1	50	...	...
2	30	1	37	...	...	...	...
...	...	3	38	...	...	...	...
...	...	1	39	...	...	...	...
...	...	1	40	...	...	...	...

Evidence of a similar character is furnished by Table III which shows the depth at which water-bearing sand was reached for which there is strong presumption that the water contained therein is under pressure. Till wells are sunk and attempts made to utilize the water, it is not

absolutely certain that the supply is of a sub-artesian nature. These results are of considerable importance as tentatively at any rate they point to the conclusion that, when a boring has penetrated 60 feet from the surface of the ground and sub-artesian water is not struck, there is little likelihood of it being struck at a greater depth. This of course only applies to the area round Ponnéri in which borings have been made.

TABLE IV

Showing depths, etc., bored through with no results up to 31*st March* 1908.

31 to 40 ft.		41 to 50 ft.		51 to 60 ft.		61 to 70 ft.		71 to 80 ft.		81 to 90 ft.		91 to 100 ft.	
No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.
1	31	1	41	1	51	4	61	1	71	1	84	1	93
2	37	1	42	4	52	3	62	1	74	...	...	...	...
2	38	1	43	1	53	2	63	1	80	...	...	...	...
1	40	1	45	4	54	3	65	...	...	...	...	...	...
...	...	2	46	2	55	1	66	...	...	...	...	...	...
...	...	3	47	8	56	1	67	...	...	...	...	...	...
...	...	1	48	3	57	5	68	...	...	...	...	...	...
...	...	1	49	5	58	2	69	...	...	...	...	...	...
...	...	...	...	2	59	...	...	...	...	...	...	...	...
...	...	...	...	3	60	...	...	...	...	...	...	...	...
6	211	11	501	33	1,835	21	1,362	3	225	1	84	1	93

In Table IV is furnished a statement showing the depth to which the boreholes were carried from which no result was obtained. Some of the boreholes obviously were stopped too soon, but 21 were carried beyond 60 feet, and 5 beyond 70 and up to 93 feet. It is only recently that boring tools have been supplied capable of boring to a greater depth than 50 feet, and I hope that a considerable number of boreholes will be put down from the bottom of existing wells to much greater depths than has hitherto been possible so as to definitely ascertain whether there are deep-seated beds of sand containing water such as exist in the neighbourhood of Pondicherry, where the depth of the artesian boreholes varies from 120 to 350 feet. In the alluvial deposits along the coast boring work is not very expensive, the average cost for a 3-inch borehole being about 4 annas a foot up to a depth of 20 feet. Thence onward to 40 feet depth it costs 6 annas a foot, and beyond up to 60 feet 12 annas a foot. From 60 to 70 feet the cost is Re. 1 a foot and from 70 to 80 feet Rs. 1-4-0 a foot. Beyond that depth only a few borings have been made and the cost of the work done has varied considerably.

16. In the reports of the Deputy Collector a certain amount of information has been furnished regarding the utilization of the water-supplies which have been opened up, and to that information I can, at the present time, add very litle, but I am informed that a considerable number of wells will be sunk towards the end of the hot weather when the work can be done most cheaply. I have already alluded to the important fact that five oil-engines and pumps are now being installed and will all shortly be at work.

17. The expenditure upon boring operations during the nine months the Deputy Collector was in charge amounted to Rs. 2,230-1-11, and during the last three months an additional expenditure amounting to Rs. 5,091-3-9 was incurred, of which over Rs. 4,000 was for the purchase of new boring tools.

MADRAS,
June 1908.

A. CHATTERTON,
Director of Industrial and Technical Inquiries.

APPENDIX II.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST—1907-08.

I have the honour to present the following report of the work done in the Government Botanist's office during the year 1907-1908.

Mr. (now Dr.) C. A. Barber continued to be on leave in England and the Director of Agriculture was in charge of the office for one month in the beginning of the year. On the 1st May M.R.Ry. Rao Bahadur C. K. Subba Row Avargal took charge as Acting Government Botanist and continued in this capacity for the rest of the year. In his untimely death, which has just been reported, the department has sustained an irreparable loss. His knowledge of the agriculture of the Presidency was unequalled and he had the gift of acquiring the confidence of the agricultural classes in a unique degree.

A few changes were made in the clerical section. The first two clerks were transferred to the office of the Deputy Director of Southern Division and the Librarian of the Agricultural Department was doing the duties of the Head clerk assisted by the third clerk without prejudice to his own duties till December 1907, when the third clerk was appointed to the post of Head clerk. The other sanctioned post was filled up in January.

The three appointments of fieldmen that fell vacant were filled up and they were placed under the Systematic, Economic and Entomological Assistants respectively for training.

2. The Acting Government Botanist spent 175 days on tour visiting Ganjám, Vizagapatam, Gódávari, Kistna, Kurnool, Bellary, South Arcot, Tanjore, Madura, Tinnevelly, Coimbatore, Malabar and South Canara districts. He exhibited his waterlift at the Mysore Dasara exhibition and attended the Agricultural Conference at Pusa.

On his first tour in the Southern districts, " the Ceded Districts method" of extracting edible oil from safflower seed was shown to the people of Tinnevelly. At present they only extract a burning oil from the seed. Advice was given to the Kumbakónam Agricultural Association as to the work to be done by them in their farm, and the Tambiran of Tirupanandal and Diwan Bahadur Raghunada Rao were interviewed, and the advantages of manufacturing sugarcandy and jaggery according to Hadi's improved methods were explained to them. Sir Subramania Aiyar's mango garden at Nidamangalam was again visited and a few hints regarding the treatment of barren trees were given, the chief advice being the application of different kinds of manures. The cultivation of the Indian mulberry, which generally grows to a tree, as a field crop, was inspected at Mangudi in the Tanjore district.

A thorough inquiry was made in many parts of the Presidency into the cultivation of sunn-hemp and a bulletin containing much valuable information was compiled.

The Government Botanist also visited in the course of the year most of the centres where the cultivation of grapes and figs is carried on and wrote a bulletin on the methods observed and the prospects of extending the cultivation, at present confined to a few localities.

The fibre inquiry was extended to different kinds of plantains and the percentage of fibre obtained from each, the chief being the Sirumalai plantain of Dindigul and Nandrum of Malabar. Fibre was also extracted from " Kurinja kodi " (*Dregea volubilis*) and about a pound of it was forwarded to the Reporter on Economic Products. A few Erukkan (*Madar-Calotropis gigantea*) plants were thickly planted in the office paddock to get them to grow tall and branchless for extracting long fibre. Experiments were made to extract fibre from kittal (*Agave cantula*) blades and good results obtained and a trial for fibre from pineapple was also made. Efforts were made to get fibre from *Agave americana* by passing the blades in a sugar mill, but the results were not satisfactory.

Experiments in extracting oil called " Cardole " from cashewnut shells were made and some oil extracted.

The Mysore Agricultural Show was visited under Government orders and the see-saw waterlift exhibited.

The flora and fauna of the Kolair lake were studied, and even though the monsoon there was a failure " Alliyalu " (*Nymphæa lotus*) largely used as a food by some classes was found to grow extensively and the best economic use of its seeds noted and a short report written on it.

A collection of samples of commercial rice was made for the Reporter on Economic Products.

During the tour in Malabar and South Canara products of interesting economic importance were collected and useful information on fish manure and other points of agricultural importance was obtained.

The Government Botanist attended the Agricultural Conference held at Pusa in February and on return from there he investigated several economic products in the Gánjam and Vizagapatam districts including Gaddi chanigalu (*Lathyrus sativus*) and Bodi chanigalu (*Lens esculenta* ?) rarely cultivated in Southern India, and fibrous plants, such as *Careya arborea*, *Marsdenia indica* and *Grewia tiliæfolia*, were collected in Ganjám.

Much various agricultural information was collected by the Government Botanist in the course of his travels and some notes on points of interest were sent to the Agricultural Journal of India for publication.

3. During the year two papers of Dr. Barber (on leave) on studies in root parasitism — (1) Haustorium of Santalum album, part (ii), and (2) Haustorium of Olax scandens — were published in the Botanical series of the Agricultural memoirs.

4. *Work in Systematic Botany.*—The Systematic Assistant was on leave on medical certificate during the first nine weeks of the year owing to a severe attack of the Nallamalais fever and on joining duty he attended to the thorough cleaning of the herbarium collections and office in general and to the preparation of a full list of the host plants of different root parasites for forwardal to Dr. Barber in England.

The work in general of this Assistant has been of a varied character. Besides keeping the herbarium collections in thorough order, the collection "not yet added to the herbarium" has been supplemented by about 2,000 sheets mounted from the old collections. The sheets set apart for the Calcutta herbarium now number about 1,470 and will be forwarded as soon as they are dealt with.

Seeds of the following root parasites were sent to Dr. Barber in England for experimental sowing and special study :—*Santalum album* from Mysore, *Olax scandens* from Palur, *Ximenia* and *Opilia* obtained from the Nallamalais forests and lastly *Cansjera Rheedii* collected by the Assistant in the Madura and Tinnevelly lower hills.

A large number of specimens was selected from the old duplicate collections of the office for forwardal to Mr. Reineck of Germany.

The whole set of the Grewia collections of the Madras herbarium was sent to Mr. Drummond at Kew for examination and return and a series of Balanophora specimens (spirit and dry) to the Botany school at Cambridge.

A few minor lots of plants were named for some forest officers, Deputy Director, Northern Division; Deputy Director, Southern Division; and Mr. Fyson, Professor of Biology, Presidency College; and among these were the alkali land plants of Bellary.

A set of dried graft mango plants was sent by the Magistrate of Calicut, in connection with a criminal case, for expert opinion. The specimens were examined and reported to be false graft plants. The Assistant had to appear in this connection before the Presidency Magistrate, Egmore, to record evidence on commission to the above effect.

Mr. Main, Assistant to the Inspector-General of Agriculture, visited the herbarium and examined the whole collection of pepper in company with Mr. Sampson.

The chief work of the Assistant has been the examination and study of the fodder grasses of the Northern Circars, Vizagapatam excepted, under the orders of the Director of Agriculture on a letter from the Inspector-General of Agriculture. A good number of grasses of feeding value, in different stages, was collected, and a special study was also made of the grass flora of the Samalkót farm. Among the fodder grasses and plants collected Chengali (*Iseilema Wightii* and *I. laxum*), Molava (*Andropogon annulatus* and *A. caricosus*), Thondungi (*Ischaemum aristatum*), Alumu (*Rhynchosia aurea*) and Pillimisera (*Phaseolus trilobus*) appear to be the best. A fair quantity of seed of each variety was collected and forwarded to the Deputy Director, Northern Division, Deputy Director, Southern Division, and the Principal of the Coimbatore Research Institute for experimental cultivation. The Thondungi grass seeds were sown in the office paddock for purposes of identification. Two reports were prepared on this collection of grasses and submitted to the Director of Agriculture. A set of these grasses has since been sent to the Agricultural Chemist for favour of analysis.

About the end of the official year the Madura and Tinnevelly lower hills were visited for re-examining the root system of *Cansjera Rheedii* and collecting its fruits. In this tour *Olax Wightiana* was also found to be a root parasite.

The Assistant was on tour for 119 days, of which 104 days were spent in the study and collection of grasses in the Circars and 15 days in Tinnevelly and Madura hills regarding *Cansjera.*

No special systematic survey was made owing to the absence of Dr. Barber in England.

5. *Work in Economic Botany.*—The Assistant was on tour over 142 days accompanying the Government Botanist in most of the tours and assisted him in his enquiries. Independent tours were made in Horseley konda, the Tettu hills, Markanam, Courtallum, Mundanthorai and a few other places in connection with the collection of varieties of lichens which were forwarded to Austria for identification. A collection of fodder grasses of the Tiruvellore taluk of the Chingleput district was made, and lastly a tour was undertaken in the Coimbatore district for ascertaining the present state of the agave fibre industry.

6. *Work in Mycology.*—The Assistant in Mycology, who was deputed to be in charge of the palmyra disease operations in October 1906, is still engaged in the same work. He has also conducted several inoculation experiments with the palmyra disease fungus (*Pythium palmivorum*), under instructions from the Imperial Mycologist.

7. *Work in Entomology.*—The chief work of the Assistants consisted of the study of the important crop pests in some of the Government, Court of Wards and private farms and the investigation of the insect pests reported by the Agricultural Associations, district officers and private agriculturists. The economic collection was thus increased considerably, the serial number being double that of the last year. Of the various pests studied, special attention was devoted

to the study of surul on groundnut and stem borer on paddy. A report has been prepared on the former and may be shortly published. Experiments in the shape of spraying were tried mostly with encouraging results, in the Government farms and private fields.

The Imperial and Supernumerary Imperial Entomologists visited this province; the former, came twice and inspected the work of the Assistants on both the occasions, and the latter spent about four months touring in different parts of the Presidency.

8. The First Assistant was on tour for about 158 days. He visited most of the Government farms, a few zamindari ones and many other places noting the important crop pests and collecting specimens. At the instance of the Imperial Entomologist he visited the Nilgiris, Shevaroys and Bangalore for investigating the potato pest, Cuddapah, Kurnool, Anantapur and Coimbatore for the melon-fly and Kamalapuram for Caravonica cotton boll worm.

9. The Second Assistant was away for about 170 days. He attended to the crop pests and tried remedial measures at Hagari and Palur for about two months. He visited several other places and made a study and collection of crop pests. During his examination of a paddy pest at Settigunta he met with a pest "probably surul" on a wild plant called *Psoralea corylifolia*. Light trap experiments were also made by him at Palur.

CAMP, PALLADAM,
20th June 1908.

M. E. COUCHMAN,
Director of Agriculture in charge of the Government Botanist's office.

APPENDIX III.

REPORT ON THE COLLEGE OF AGRICULTURE, SAIDAPET, FOR 1907–1908.

I have the honour to submit the report on the College, Veterinary Hospital. the Farm and Botanical garden for the year ending 31st March 1908. In accordance with the instructions contained in your letter Dis. No. 704, dated 21st March 1908, the report has been made concise and comprehensive. It consists of two parts, the first part dealing with the College and Veterinary Hospital and the second with the Farm and Botanical Garden.

PART I.—COLLEGE AND VETERINARY HOSPITAL.

1. I continued to act as Vice-Principal in charge and M.R.Ry. R. V. Subramania Aiyar, M. R. Ramaswami Sivan, J. Chelvaranga Raju and T. V. Narayana Rao as second, third, fourth and fifth assistants respectively. M.R.Ry. R. V. Subramania Aiyar, who was deputed in April 1907 to survey and map the Central Farm at Coimbatore and the other agricultural farms, returned to the College in October and was engaged till December in instructing the candidates from among the students and ex-students for Surveying and Levelling and Agricultural Engineering. The candidates were men who had previously appeared in these subjects and failed. From January he was engaged with the other assistants in connection with the packing and despatching of furniture, apparatus, etc., to Coimbatore. M.R.Ry. J. Chelvaranga Raju went on a year's furlough in continuation of the college summer vacation. He was recalled from leave on 14th January 1908 and has since been placed on special duty under the Deputy Director of Agriculture, Southern Division. During his absence on furlough, M.R.Ry. T. V. Narayana Rao acted as fourth assistant and M.R.Ry. S. P. Swaminathen, as fifth assistant, without prejudice to his duties as hospital-keeper. M.R.Ry. S. Ramji Singh continued to be Gymnastic Instructor till 6th August 1907, when he was transferred to the Veterinary College, Vepery.

2. As mentioned in the last year's report, there was but one class left at the beginning of the year and its strength was 17. One of the students discontinued his studies and two ex-students joined the college towards the latter part of the session with a view to complete their tests for the Diploma, so that the strength of the class at the end of the session—31st December 1907—was 18.

3. *Instruction.*—Instruction was given as in previous years as laid down in G.O., No. 429, Educational, dated 24th July 1902.

Lectures.—Lectures were delivered in the third year's subjects, viz., Agriculture including Entomology, Agricultural Chemistry and Veterinary Science and Hygiene.

Practical work.—The students had a practical course in the Dairy, in ploughing and in other farm operations. They undertook their second and last term of agricultural enquiry in the Cuddapah district with M.R.Ry. T. V. Narayana Rao as the assistant in charge of them. The tour lasted from 9th to 28th September 1907. In Agricultural Chemistry, the practical work consisted of quantitative analysis of food-stuffs and manures. In the Veterinary Science and Hygiene the students had practice in compounding, in diagnosing and prescribing and in dressing cases and performing minor operations.

4. There were numerous applications for admission into the college, and the demand for the services of trained candidates was greater than in previous years. This is evidently due to the institution of Agricultural Associations and the wide-spread interest now being taken in agricultural matters.

5. Gymnastic and Physical drill classes were held till 6th August 1907 when they were dropped on account of the removal of the Instructor from the college staff.

6. All the 18 students referred to in paragraph 2 above, applied for admission to the Government Technical Examinations held in December last, but only 17 appeared, the remaining one having been prevented by illness. The results are shown in the subjoined statement. They were on the whole satisfactory. Six candidates qualified themselves for the Diploma. All these were from among the regular students of the class.

Subject.	Candidates who appeared for the first time.			Candidates who appeared after having previously failed.		
	Appeared.	Passed.	Percentage.	Appeared.	Passed.	Percentage.
Botany, Intermediate, Special	..	..	..	4	2	50·0
Meteorology and Geology, Intermediate, Special	..	..	..	* 4	3	75·0
General Chemistry, Intermediate	..	..	..	3	1	33·3
Anatomy and Physiology, Intermediate, Special	..	..	..	* 9	(a) 7	77·7
Veterinary Science and Hygiene, Intermediate, Special.	15	(b) 14	93·3	..	..	..
Surveying and Levelling, Intermediate, Special	..	..	..	* 4	3	75·0
Agricultural Engineering, Intermediate, Special	..	..	..	† 7	5	71·4
Agricultural Chemistry, Advanced	12	(c) 8	66·7	1	0	0·0
Agriculture, Advanced	* 15	(d) 11	73·3	1	1	100·0

* Exclusive of one who did not appear. † Exclusive of one who did not give his second paper.
First-class—(a) 2 ; (b) 3 ; (c) 1 ; (d) 1.

Nine ex-students appeared for the examination in different subjects and four of them completed their tests for the Diploma.

7. The Clogstoun prize of the value of Rs. 45-6-2 was won by K. Unni Krishna Menon, a stipendiary student from Malabar, for having secured the highest number of marks in the college examinations during the three years' course. The Robertson prize of the value of Rs. 87-4-6 was won by V. M. Bania, a paying student from Central India. This prize is awarded to the student who secures the first place in Agriculture advanced at the Government Technical examinations. V. M. Bania was also entitled to the guaranteed appointment of Rs. 40, for having secured the highest number of marks in the Diploma examination. He declined to accept it as he is a large land-holder and intends to engage himself in farming his own lands. Krishna Menon ranks second with regard to the total number of marks, and I have submitted to you with recommendation his application for the guaranteed appointment.

8. *Museum.*—On account of the approaching closure of the college and the numerical weakness of the staff, the museum did not receive any special attention.

9. *Veterinary hospital.*—I continued to be the officer in charge with M.R.Ry. S. P. Swaminathan as hospital-keeper. As mentioned in the last year's report, he has been conducting practically all the work of the hospital ever since I was placed in charge of the office of Principal and he has done it well. There was a considerable improvement in the number of cases treated this year, and the increase in cattle patients is particularly notable, and is an evidence of the increasing popularity of the hospital among the local ryots. The number of cases treated during the last three years has been as below :—

——	1905-06.	1906-07.	1907-08.
Horses	350	386	413
Cattle	551	557	630
Other animals	351	360	371
	1,252	1,303	1,41[illegible]

The increase in receipts, which were Rs. 978-5-4 as against Rs. 969-9-5 in the past year, was slight. The expenditure was Rs. 1,474-8-8 as against Rs. 1,686-5-9 in 1906-07. The fall was chiefly due to the appointment of M.R.Ry. S. P. Swaminathan as acting fifth assistant during a part of the year, when his pay was drawn under the college establishment. A statement showing the details of income and expenditure of the Veterinary Hospital is appended.

10. The financial statement for the year is also appended.

11. I beg to acknowledge the services of the staff and officers of the college.

Part II.—Farm and Botanical Garden.

1. During the year under report, I continued to be in charge of the farm and botanical garden. M.R.Ry. J. Chelvaranga Raju continued to be Farm Manager until 30th April, when he went on furlough. M.R.Ry T. V. Narayana Rao succeeded him on 1st May as Farm Manager and has held the post since. V. S. Subramania Sastri was Bailiff throughout the year. The post of Assistant Bailiff which had been vacant from 1st July 1906 was filled up on 1st July 1907 by the appointment of N. S. Kulandaiswami Pillai, a passed student of the college. He was transferred for employment under the Deputy Director of Agriculture, Southern Division, on the afternoon of 29th February and the place has since remained unfilled.

There is nothing of special interest to note in the working of the farm and the botanical garden during the year. Both were kept going with the minimum expenditure. The number of working cattle fell to half the usual number and the establishment of permanent coolies underwent a great reduction, many coolies having left in consequence of the approaching closure of the farm.

2. *Season.*—The rainfall registered during the year was as below. Hot weather (April and May) 0·13 inch; south-west monsoon (June to September) 12·42 inches; north-east monsoon (October to December) 36·18 inches; dry weather (January to March) 0·94 inch; total 49·67 inches.

During the south-west monsoon the rainfall was below the average of 17·21 inches. There were some showers in June and, taking advantage of these, some catch crops were sown but as the showers later were few and light and far between, some of the crops failed and cattle were allowed to graze them up, while the yield from the others was very poor. During this season paddy was sown dry and a crop of varagu was also sown.

The fall during the north-east monsoon was above the average of 30·68 inches. Nearly half the amount fell in November alone which damaged to some extent a crop of paddy which had then far advanced in maturity. This crop had been transplanted in September and was being irrigated from the oil-engine. In this season the wet cultivation of paddy and the cultivation of some dry grain crops was taken up.

3. *Crops and cropping.*—A statement giving the necessary particulars about the crops grown is appended. The number of working cattle and of permanent coolies being limited, water for irrigation not being available in the Mylapore tank in time, and owing to the approaching closure of the farm, it was not possible nor was it considered necessary to crop the farm to the usual extent. The total cultivated area including double and single crop lands with the lands on which crops stood throughout the year was 74·92 acres. The following notes about some of the crops may be of interest.

Paddies occupied 22·31 acres—sixty-day samba, 7·90 acres; chinna samba, 8·01 acres; sirumani, 5·20 acres; Bombay varieties, 1·20 acres. The three usual methods of cultivation were followed, namely, drilling dry, sowing sprouted grain in puddle and transplanting.

Sixty-day samba was sown dry by gorru on 1·6 acres on 17th September and harvested on 30th December. The crop was treated dry throughout. It practically failed.

2·60 acres were under sirumani sown dry with gorru and subsequently irrigated from the Mylapore tank. The outturn was at the rate of 1,904 lb. of grain and 1,940 lb. of straw per acre. No manure was applied. About the same time an acre was cropped with chinna samba sown dry and then irrigated from the Mylapore tank. 224 lbs. of bone dust were applied. The yield was 1,278 lbs. of grain and 2,800 lbs. of straw. 2·35 acres were sown with chinna samba and irrigated as above. No manure was applied. The outturn was at the rate of 1,138 lbs. of grain and 1,800 lbs. of straw per acre.

50 lbs. of sirumani paddy were sown in a nursery of 15 cents and transplanted on 2·6 acres. The soil was loamy. An acre of the crop had the stubbles of a previous crop of sugarcane ploughed in and the yield was 3,080 lbs. of grain and 3,200 lbs. of straw. To the remaining 1·6 acres 400 lbs. of white castor cake were applied and the outturn was at the rate of 3,325 lbs. of grain and 3,400 lbs. of straw per acre. The seedlings were planted at the usual distance but only 2 or 3 in each spot. It will be seen that the seed rate in this case was only 19 lbs. per acre and that the outturn was nevertheless very good.

45 lbs. of chinna samba paddy were sown in a nursery of 15 cents and a portion of seedlings, when a month old, was transplanted on 3·20 acres. Of this 2·45 acres received an application of farmyard manure at the rate of 15 tons per acre. The remaining area, 0·75 acre, was unmanured. The yield of the manured area was at the rate of 2,851 lbs. of grain and 3,429 lbs. of straw and that of the unmanured at the rate of 1,716 lbs. of grain and 2,240 lbs. of straw per acre. The remaining seedlings when they were about 1½ months' old were transplanted on a plot of 70 cents with an application of 200 lbs. of white castor cake. The yield was 2,469 lbs. of grain and 3,360 lbs. of straw per acre. Thus the seedlings from 45 lbs. were sufficient to transplant an area of 3·90 acres. The seedlings were planted single about 6 inches apart. The seed rate which came to 11·5 lbs. per acre, to say the least, did not affect the outturn.

Chinna samba sprouted was sown on ·76 acre of puddled land, of which ·30 acre was irrigated from the oil-engine and the remaining ·46 from the Mylapore tank. The yield per acre was 1,140 lbs. of grain and 1,867 lbs. of straw and 2,326 lbs. of grain and 2,240 lbs. of straw, respectively. The second crop had castor cake applied to it at the rate of 200 lbs. per acre.

Sixty-day samba sprouted was sown in puddle on 6·30 acres. Of this, 4·30 acres were under the oil-engine and were sown on different dates between January and September 1907. The remaining 2 acres were under the Mylapore tank and were sown in October. The former crops yielded at the rate of 3,350 lbs. of grain and 2,240 lbs. of straw per acre and the latter at the rate of 1,296 lbs. of grain and 1,360 lbs. of straw. There is a general impression that this variety of paddy does not do well in the rainy season and this has been the experience on the farm.

The eight varieties of Bombay paddy mentioned in the last year's report were grown on an acre—each variety on 12½ cents. They were sown sprouted in puddle in October and irrigated from the oil-engine; 10 lbs. of saltpetre were applied to each plot. The yield was poor as in last year, the average of all the varieties being 1,124 lbs. of grain and 1,529 lbs. of straw per acre as against 1,107 lbs. of grain and 2,753 lbs. of straw last year. Banku which is the variety that is in general demand yielded fairly well, the outturn being at the rate of 1,440 lbs. of grain as against 1,361 lbs. last year.

Cholam and varagu for grain grown on 10·1 acres yielded fairly well.

Horse-gram for grain was sown on 9·50 acres. The crop was sown late (December) and the harvesting was not completed before the end of the official year.

A crop of cholum for fodder sown in February 1907 on 2½ acres gave 25,032 lb. in three cuttings. Another crop on 2½ acres sown at the beginning of July suffered for want of timely rains and yielded only one cutting of 7,280 lbs.

Horse-gram for fodder occupied 9·75 acres of poor sandy soil. The yield as hay was 15,513 lbs.

Guinea-grass occupied 6·06 acres. The crop was weeded and intercultured but no manure was applied. The yield from the whole area during the year was 85,736 lbs. which means 14,148 lbs. per acre.

The plantain crop on 2 acres referred to in the last year's report is still standing. Nothing was done beyond occasional watering. Sale-proceeds of fruits, leaves, suckers, etc., during the year amounted to Rs. 237. The crop on 1½ acres is more than 3½ years' old and that on the remaining ½ acre came into bearing about six months ago.

Caravonica cotton stands on ·2 acre. The crop was raised in August 1905. As reported in previous reports this crop has been a practical failure on the Saidapet farm. It bore only 3¾ lb. of cotton-in-seed during the year.

4. *Manures.*—No manurial experiments were conducted nor were any special manures purchased but such as were in stock were applied to paddy crops. The collection of farm yard manure during the year amounted to 95 tons.

5. *Implements, machines, etc.*—The ordinary farm implements such as ploughs, seed drill, etc., were freely used. The chaff-cutter and dairy appliances were also in frequent use. Of the machines, implements and tools selected for the Coimbatore College almost all were despatched at the end of the year. The few that are still remaining will be sent when the farm is closed, as they are necessary for current use.

The oil-engine worked fairly steadily throughout the year. The cost of working was Rs. 620–14–3 for raising 25,662,500 gallons through an average height of 21·57 feet as against Rs. 542–13–9, the cost last year for raising 31,018,667 gallons through an average height of 22·43 feet. This works out to Re. 0–0–4·89 for lifting one acre inch to a height of one foot during the current year as against Re. 0–0–3·40 in last year. The increase in cost this year was due to the charges incurred in repairing certain parts of the engine, to the high wages which had to be paid to a driver engaged from Messrs. Massey & Co. during the absence of the permanent incumbent on leave, and also, to some extent, to the engine not raising the full quantity of water during the last few months of the year, owing to a crack in the vaporizer.

6. *Livestock—Cattle.*—There were 66 head of cattle at the commencement of the year. Ten calves were born during the year. Twenty-six head of cattle (six cows, four heifers, two heifer calves, four bull calves, five bulls and five bullocks) were sold in auction by the Madras Stable Company in May. Four head of working cattle were sold to the Deputy Director of Agriculture, Southern Division, for the Palur farm. Ten head (three cows with calves at foot, two heifers and two bullocks) were transferred to the Coimbatore farm. One bull was accidentally drowned in the Adyar river and one calf died of the bite of some venomous reptile. There were thus at the end of the year 34 head—eight cows, nine heifers, one heifer calf, nine bulls, one bullock and six bull calves.

Sheep.—At the beginning of the year they were 65 head. During the year there were 35 births and 8 deaths and 64 were sold, so that at the close of the year the number of the stock was 28.

7. *Distribution of seeds, implements, etc.*—Bombay varieties of paddy, guinea-grass roots and plantain suckers were supplied to those that applied for them. Fifteen applications were received for the "Neelakantacharry" ploughs and were complied with.

8. *Botanical garden.*—M.R.Ry. T. V. Narayana Rao continued to be in separate charge of the graden until the end of April. After he was appointed Farm Manager on 1st May consequent on the grant of furlough to M.R.Ry. J. Chelvara ngaraju, the garden was looked after by the manager and the bailiff as part of the farm. There is nothing of special interest to be recorded about the working. Owing to the impendin g closure of the college, about half the number of coolies left of their own accord. No special manures were purchased, the only manure used being farm yard, which was supplied from the farm. The permanent botanical specimens were maintained in proper condition. As it was expected that the garden along with the farm would be closed in January, no special vegetable seeds were procured from outside as in previous years. A portion of the garden was under fodder crops, a small portion under plantains and vegetables occupied a small area. The ordinary specimen crops including varieties of sorghum were grown.

A collection of sorghums was exhibited at the Flower Show held at the Agri-Horticultural Society's gardens at Tenampet in February last and secured a prize of Rs. 10.

9. A statement showing the receipts and expenditure of the farm and botanical garden is appended. The receipts and expenditure were Rs. 5,585-10-11 and Rs. 3,948-7-11 as against Rs. 5,657-6-7 and Rs. 5,690-15-9 last year.

10. In conclusion I beg to record my entire satisfaction with the manner in which M.R.Ry. T. V. Narayana Rao and Subramania Sastri discharged their duties as farm manager and bailiff respectively.

S. L. D'SILVA,
Ag. Vice-Principal.

Appendix I.

STATEMENT showing expenditure and income at Veterinary Hospital.

	1906–1907.			1907–1908.		
Expenditure—	RS.	A.	P.	RS.	A.	P.
Establishment	876	0	0	552	14	7
Hospital charges	268	3	9	226	11	10
Medicines and instruments	388	14	1	516	14	6
Repairs to hospital buildings	153	3	11	177	15	9
Total ...	1,686	5	9	1,474	8	8
Income—						
Subscriptions	24	0	0	32	0	0
Payment on account of stabling	283	1	1	259	11	4
Payment on account of advice and medicines.	577	6	7	588	1	6
Payment on account of sundry matters ...	85	1	9	98	8	6
Total ...	969	9	5	978	5	4

Appendix II.

FINANCIAL statement (including Accountant-General's adjustments received up to date).

No.	Items.	Budget estimate, 1907-1908.	Expenditure. 1906-1907.	Expenditure. 1907-1908.
		Rs.	Rs. A. P.	Rs. A. P.
1	Principal and Vice-Principal	1,557	902 9 3	1,556 10 8
2	Masters and teachers	8,104	8,811 0 0	8,104 7 8
3	Establishment	2,365	2,301 10 4	2,363 0 5
4	Travelling allowances	534	198 0 9	510 1 9
5	Veterinary Hospital establishment	577	876 0 0	552 14 7
6	*Supplies and services—*			
	Library allowance	100	5 12 0	4 8 0
	Prize allowance		..	..
	Scholarships	1,350	1,766 14 7	550 0 0
	Petty works of construction	..	..	..
	Laboratory charges	200	301 12 0	210 12 1
	Veterinary Hospital charges		268 3 9	226 11 10
	Repairs to Veterinary Hospital buildings	2,100	**388 14 1**	**516 14 6**
			153 3 11	177 15 9
	Furniture and appliances including Europe stores and purchase of live-stock	100	6 10 3	14 13 0
	Batta and carriage to Agricultural students	300	504 0 9	189 13 0
	Farm annexe	5,834	4,931 1 7	3,589 9 0
	Botanical garden	1,000	759 14 2	358 14 11
	Deduct amount transferred	— 6,032	..	..
	Add additional allotment	896	..	..
7	*Contingencies—*			
	Petty repairs to buildings	400	100 11 0	17 7 6
	Cleaning charges	35	39 9 9	40 1 4
	Rents, rates and taxes	170	164 8 0	164 8 0
	Repairs to furniture	50	2 4 0	1 5 6
	Tour charges	80	26 5 9	630 10 2
	Postage charges	80	60 0 6	50 0 0
	Telegraph charges	5	3 0 0	2 10 0
	Purchase of books	12	0 4 0	0 4 0
	Office expenses	487	409 5 2	282 0 11
	Miscellaneous	..	..	..
	Deduct amount transferred	— 771	..	..
	Do. to supplies and services	— 115	..	..
	Add additional allotments sanctioned	750	..	..
		50	..	..
	Total ..	20,218	22,592 13 6	19,599 4 1
			388 14 1	**516 14 6**
	Receipts—			
	Farm annexe	..	5,657 6 7	5,585 10 11
	College fees	..	336 0 0	77 0 0
	Rents and miscellaneous	..	201 1 11	189 9 7
	Veterinary Hospital	..	969 9 5	978 5 4
	Total ..	..	7,164 1 11	6,830 9 10

Note.—The figures in clarendon are Accountant-General's adjustments.

Appendix III.

CROPPING statement for 1907–1908.

Serial number.	Field number.	Area.	Name of crop.	Date of cropping.	Date of harvest.	Yield.				Remarks.
						Grains.		Straw or green fodder.		
						Amount.	Per acre.	Amount.	Per acre.	
		ACS.				LB.	LB.	LB.	LB.	
1	1	7·00	Horsegram for fodder.	14th and 15th June 1907.	..	..	..	..	..	Crop failed and was grazed by cattle.
2	1	7·00	Horsegram for grain.	5th and 6th December 1907.	25th March to 1st April 1908.	..	..	.	..	Grain not thrashed.
3	2	3·00	Horsegram for fodder.	18th June 1907.	..	..	..	..	..	Crop failed, and was grazed by cattle.
4	2	2·50	Cholum for fodder.	3rd and 4th July 1907.	22nd August 1907 and subsequently.	..	..	7,280	2,912	The crop suffered for want of timely rains in July and August. Hence only one cutting obtained.
5	2	..	Cholum for grain.	Do.	27th December 1907.	..	..	1,680	5,600	The crop on 30 cents of land (out of the above 2·5 acres) was left for grain after the cutting for fodder, and 21 lbs. of grain obtained.
6	2	2·50	Horsegram for grain.	7th December 1907.	..	..	..	..	..	Crop standing on 1st April 1908.
7	3	1·50	Cholum for fodder.	8th February 1907.	..	..	..	25,032	16,688	Crop standing from the previous year, yield is for two cuttings.
8	4	1·00	Guinea grass for fodder.	31st August 1906.	..	..	..	15,344	15,344	Yield from six cuttings.
9	5	1·50	Do.	16th November 1906.	..	..	..	27,496	18,331	Yield from seven cuttings.
10	5	0·20	Caravonica cotton.	23rd November 1905.	..	..	..	..	..	3 lbs. 12 oz. cotton-in-seed picked.
11	6	1·60	Guinea grass for fodder.	25th November 1905.	..	..	..	20,916	13,072	Yield from five cuttings.
12	7	1·96	Do.	22nd August 1906	..	..	..	21,980	12,214	Yield from six cuttings.
13	8	2·70	Varagu.	27th July 1907.	3rd and 4th February 1908.	616	228	1,000	370	Poor sandy field subject to trespass by cattle.
14	9	1·30	Yellow cholum for grain.	30th October 1907.	27th and 28th February 1908.	327	252	3,360	2,585	
15	11	2·00	Plantains.	10th August 1904, and 27th June 1906.	..	..	..	..	..	Yielding.
16	13	2·00	Cholum.	2nd September 1907.	6th January 1908.	222	111	6,160	3,080	
17	15	1·50	Horsegram for fodder.	7th August 1907.	10th to 17th October 1907.	..	..	5,200	3,467	Yield represents green fodder.
18	16	1·00	Do.	8th August 1907.	9th December 1907.	..	..	780	780	Yield represents hay.
19	25	5·00	Do.	19th July 1907.	Do.	..	..	8,400	1,680	Do.
20	28	2·25	Do.	8th August 1907.	13th December 1907.	..	..	4,760	2,116	Do.
21	28	4·10	Black cholum.	3rd September 1907.	3rd January 1908.	450	110	10,080	2,459	Sown for fodder, but subsequently left for grains.
22	10	1·20	'Sixty-day' samba.	5th July 1907.	5th October 1907.	4,020	3,350	2,690	2,240	Sprouted seeds sown in puddle.
23	10	0·20	Dadkhani.	30th October 1907.	28th February 1908.	150	750	141	705	Do. do.
24	10	1·00	Varieties of Bombay paddy.	Do.	Do.	1,124	1,124	1,529	1,529	Do. do. 80 lbs. of saltpetre were applied.
25	12	1·50	'Sixty-day' samba.	16th January 1907.	April and May 1907.	2,613	1,742	3,360	2,240	500 lbs. of white castor cake applied. Sown broadcast in puddle.
26	12	2·45	Chinna samba.	25th September 1907.	20th January 1908.	6,984	2,851	8,400	3,429	Transplanted. About 30 tons of farmyard manure applied.
27	12	0·30	Do.	30th October 1907.	4th March 1908.	342	1,140	560	1,867	Sprouted seeds sown in puddle.
28	14 (*a*)	0·85	'Sixty-day' samba.	18th January 1907.	15th April 1907.	1,340	1,576	1,200	1,412	Do. do. 350 lbs. of white castor cake applied.
29	14 (*b*)	0·75	Do.	3rd and 10th June 1907.	13th September 1907.	2,423	3,231	1,680	2,240	Sprouted seeds sown in puddle. About 9 tons of farm yard manure applied.
30	14 (*b*)	0·75	Chinna samba.	25th September 1907.	18th January 1908.	1,287	1716	1,680	2,240	Transplanted.

Cropping statement for 1907-1908—*cont.*

Serial number.	Field number.	Area.	Name of crop.	Date of cropping.	Date of harvest.	Yield.				Remarks.
						Grain.		Straw or green fodder.		
						Amount.	Per acre.	Amount.	Per acre.	
		ACS.				LB.	LB.	LB.	LB.	
31	16	1·60	'Sixty day' samba.	17th September 1907.	30th December 1907.	385	240	560	350	Poor sandy soil. Seed sown by gorru.
32	18	1·00	Sirumany.	16th October 1907.	24th February 1908.	3,080	3,080	3,200	3,200	Transplanted.
33	18	1·00	'Sixty day' samba.	22nd October 1907.	30th January 1908.	1,396	1,396	1,120	1,120	Sprouted seeds sown in puddle.
34	19	0·70	Chinna-samba	10th October 1907.	7th February 1908.	1,728	2,469	2,352	3,360	Transplanted. 200 lbs. of white castor cake applied.
35	19	0·46	Do	11th October 1907.	19th February 1908.	1,070	2,326	1,030	2,240	Sprouted seeds sown in puddle. 100 lbs. of white castor cake applied.
36	20	1·60	Sirumany.	12th October 1907.	17th February 1908.	5,320	3,325	5,440	3,400	Transplanted. 400 lbs. of white castor cake applied.
37	21	1·00	Chinna-samba.	14th August 1907.	31st January 1908.	1,278	1,278	2,800	2,800	Sown by gorru. 224 lbs. of bone dust applied.
38	22	2·60	Sirumany.	13th August 1907.	11th February 1908.	4,950	1,904	5,044	1,940	Sown by gorru.
39	26	1·70	Chinna-samba.	15th August 1907.	23rd January 1908.	1,845	1,085	3,400	2,000	Do.
40	28	0·65	Do.	3rd September 1907.	7th February 1908.	774	1,191	1,040	1,600	Do.
41	M.L No. 7	1·00	'Sixty day' samba.	23rd October 1907.	29th January 1908.	1,197	1,197	1,600	1,600	Sprouted seeds sown in puddle.

Appendix IV.

FINANCIAL statement of the College Farm including Botanical Garden for 1907-1908.

Receipts.				Charges.			
Particulars.	Amount.	Amount.		Particulars.	Amount.	Amount.	
	RS. A. P.	RS. A. P.			RS. A. P.	RS. A. P.	
Field produce. Botanical gardens.	272 4 10	2,107 6 1		Botanical gardens	358 10 11	353 14 11	
Field produce. Farm annexe.	1,835 1 3			Cattle food. Ground-nut cake.	554 0 4	917 0 3	
Live-stock. Sale of cows, calves and sheep.	1,299 13 4			Cattle food. Gingelly cake ..	98 1 3		
Live-stock. Sale of milk, butter, etc.	1,270 3 2			Cattle food. Dholl husk ..	238 4 3		
Live-stock. Covering fees ..	70 0 0	2,640 0 6		Cattle food. Straw	19 10 2		
Wood and miscellaneous ..	838 4 4	838 4 4		Cattle food. Rice, etc. ..	3 2 3		
				Cattle food. Salt	3 14 0		
				Live stock	32 4 6	32 4 6	
				Manure	1 8 0	1 8 0	
				Seeds and plants	29 6 3	29 6 3	
				Labour	1,741 7 2	1,741 7 2	
				Oil engine	620 14 3	620 14 3	
				Machines and implements ..	7 2 3	7 2 3	
				Workshop	39 5 9	39 5 9	
				Contingencies	200 8 7	200 8 7	
Total ..	5,585 10 11	5,585 10 11		Total ..	3,948 7 11	3,948 7 11	

II

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I

I have the honour to submit the report of the Civil Veterinary Department for the year 1907–1908.

2. The post of the Superintendent, Civil Veterinary Department, and the Principal of the Madras Veterinary College was held by me throughout the year. In addition to my work at head-quarters, I was on tour for 89 days, and travelled 14,065 miles by rail and 195 miles by road. I had occasions to inspect the veterinary hospitals at Madura, Trichinopoly, Coimbatore, Vellore, Bellary, Pithápuram and Vizagapatam, and was present at the cattle shows held at Tiruppúr, Madura, Berhampur and Ongole. I visited Coonoor and inspected the Pasteur Institute; I attended the Veterinary Conference at Calcutta, supervised the work of the Veterinary Assistants, and attended the outbreaks of cattle diseases. I visited Tuticorin for selecting a site for quarantine station, and Cocanada for selecting a suitable site for a veterinary hospital which was started during the year. I also inspected the Government stallion "Ophir" stationed at Uttukuli, Coimbatore district, which was suffering from chronic lameness.

3. Mr. D. Aitchison, I.C.V.D., who is a probationer, assisted me in the work connected with the college and hospital, and also attended the cattle shows held at Kottavalsa, Cocanada and Ongole.

4. In accordance with the G.O., No. 1555, dated 19th June 1907, communicated in B.P., No. 235, dated 9th July 1907, the department was strengthened by the entertainment of thirteen graduates during the year. The office establishment, however, remains the same as in the previous year, and it is hardly able to cope with the ever-increasing work entailed on it by the development of the department. It is hoped that it will soon be strengthened by the addition of two clerks.

II.—Veterinary College.

There had been no changes in the staff except that the third lecturer was confirmed. In January 1907, 29 students were entertained in class A or first year, out of which 10 left the college leaving 19 students at the end of the year, and this was the number that appeared for the examination held last year early in December. The following is the statement showing the number of passes in each class :—

Class.	Examined.	Passed.	Per cent. of passes.
A or 1st year	19	16	84·2
B or 2nd year	24	20	83·3
C or 3rd year	23	17	73·9

In class B, 26 students attended the college, but two of them failed to appear for the examination. Of the 23 students of class C, 2 of them who had failed in the previous year did not attend the college but were attached to veterinary hospitals in Madras.

As compared with last year's results, it will be observed that the number of passes in each class during the year under report are far more satisfactory.

The Board of Examiners remarked that the material was distinctly good, their theoretical knowledge was above the average, and considering the weakness in the number of the teaching staff and the conveniences available for practical teaching, the knowledge of the students was very fair on the whole.

The total strength of the college at the end of March 1908 was 74, viz., class A 26, class B 23, class C 25. In January 1908 owing to an insufficient number

of matriculates applying for enrolment in the college, only seven or eight matriculates were enrolled. Notwithstanding the advertisements calling for more candidates, applications were received only from candidates who were non-Matriculates. Therefore the required number to complete the strength of the class was selected from non-Matriculates, and an application made to the Board of Revenue for their exemption, and this was sanctioned under B.P., Mis. No. 1706, dated 5th April 1908.

This falling off of applications from Matriculates during the past two years is strong evidence that the rate of the starting pay and the general prospects of the Subordinate Civil Veterinary Department are not sufficient inducement to attract the required class of men. The attendance in all classes, both at practical and theoretical lectures, was good. The final year students were given ample and repeated opportunities of practising operations, and such other practical work, as work in the pharmacy and attendance on sick animals.

The number of major and minor operations performed during the year was 648 against 544 the previous year which may be considered as satisfactory.

They are as detailed below :—

	Major.	Minor.
Horses	178	85
Dogs	192	62
Bovines	100	27
Other animals	4	..
Total ...	474	174

During the year, a Gymnastic Instructor was entertained and he has taken some pains with the students to encourage them to take more physical exercise. The hostel contained on an average 19 students, and the health of the students was fairly good during the year.

Several valuable and useful professional books have during the year been added to the College library and a fairly good number of interesting Museum specimens have been added to the College Museum.

The total receipts of the College Hospital amounted to Rs. 8,438-3-2 during the official year as against 6,846-7-10 in the previous year.

III (*a*)—Cattle Disease.

During the year, reports were received showing a total loss of 152,834 head of cattle from disease and 14,552 from other causes against 113,539 and 15,314 respectively shown in the previous year. The loss was heaviest under "Rinderpest, diarrhœa and dysentery" which alone accounted for 63·6 per cent. of the total mortality. As compared with the previous year, there has been an increase under this heading, also under "Black quarter" and "Epizootic aphtha". On the other hand, there was a decided falling off under "unspecified disease" as well as under "Anthrax" and "Malignant sore throat".

2. The number of deaths from Rinderpest, diarrhœa and dysentery was 97,244 against 31,611 of the previous year. The districts that suffered most from the disease were South Arcot, Chingleput and North Arcot which lost 21,544, 14,430, and 12,202, respectively. With a view to check the prevalence of this disease, a Veterinary Assistant was posted in each of these districts to treat the animals so affected, and at the same time to carry on preventive inoculation. This very large increase in the number of deaths may after all be due to the more careful recording of deaths, but these statistics to my mind are altogether untrustworthy. In this Presidency cattle are only sparingly used for food and if the number of hides exported and the number used for local consumption—probably a matter of two millions—be taken into consideration, it will be seen that the death reports are quite unreliable. As was observed in the last year's report, the decline in the number of deaths from Anthrax has continued to be steady. Deaths from unspecified causes were 27,731 against 53,798 in the previous year. This possibly only indicates more carefulness in the registration of mortality—a result probably due to the increasing professional aid and scrutiny. Criminal poisoning accounted for 56 deaths.

Inoculation against Rinderpest was carried on in 16 districts, and against Anthrax in 8 districts. Preventive inoculation against Anthrax is being abandoned for the present under orders from the Inspector-General, Civil Veterinary Department. Twenty-eight thousand seven hundred and eighty-eight head of cattle were inoculated against "rinderpest"; 8,461 against "anthrax" and 1,179 against "hæmorrhagic septicæmia".

It has been reported that the total loss among horses and ponies was 203 from diseases, 14 from snake-bites and 100 from wild animals.

III (*b*)—Veterinary Hospitals.

At the commencement of the year under report there were six Veterinary hospitals at work in this Presidency, but during the year five more were started—one in each of the towns of Vellore, Coimbatore, Pudukkóttai, Vizianagram and Vizagapatam. There are thus eleven dispensaries, of which only two at Madras and Saidapet are maintained directly by Government. Those located in Madura, Trichinopoly, Vellore, Coimbatore and Vizagapatam were under the management of the District Boards concerned. The three Veterinary hospitals at Pithápuram, Pudukkóttai and Vizianagram are situated in Native estates, and are carried on under the management of their respective Rajas, while the Bellary Veterinary dispensary is conducted under the auspices of the Society for the Prevention of Cruelty to Animals and receives an annual donation from Government in aid of its funds. All these hospitals were inspected by me during the year.

The total number of in- and out- patients treated at these institutions is shown in statement No. 5 and their receipts and expenditure in statement No. 6.

In all about 28,248 animals were treated in these hospitals. This gives an average of 2,568 patients for each hospital or about 7 patients per diem. It is very satisfactory to note that in the Trichinopoly hospital there was an increase of about 1,155 cases as compared with that of last year—an unmistakable sign of good work and the popularity of the institution. In the Madura Veterinary hospital, on the other hand, there was a falling off of 1,379 patients when compared with the results of the previous year. This was mainly due to the frequent change of the Veterinary staff consequent on the absence on leave of Mr. Mooley, the permanent incumbent, for over two months and his subsequent resignation towards the close of the year. The hospital is now placed in charge of a Madras Veterinary graduate who, it is hoped, will help it to regain its former popularity.

In the Society for the Prevention of Cruelty to Animals' hospital at Bellary, about 1,904 animals were treated as against 1,968 last year. Though there is a slight decrease in the total number of cases, it is satisfactory to observe that more cattle patients were treated than in the previous year.

In the Saidapet Veterinary hospital, there has been an increase of 111 cases over last year. This hospital from its advantageous locality, being only six miles from the metropolis and in close vicinity of villages, has gained the confidence of the ryots in the neighbourhood and consequently has made great progress especially in the number of cattle patients. During the past year it continued to be under the management of the Agricultural Department, but it has since been transferred to the Civil Veterinary Department.

The hospital at Pithápuram continues in popularity and shows an increase of 323 patients over the previous year, and more cattle and horses were treated both as in- and out- patients.

In the hospital attached to the Madras Veterinary College 2,313 patients were treated during the year, but this hospital has been considered under a separate heading.

IV (*a*)—Pony-breeding Operations.

At the commencement of the year, there were 14 stallions on the rolls, the vacancy caused by the death of "Tigris" in the previous year not having been filled. They were located as usual in the districts of Coimbatore, Salem and Madura. There were ten stallions during the greater portion of the year in the Coimbatore district. A stallion was permanently stationed in Kollegal, Pollachi, Gobichettipalayam,

Palayacotta, Dhárápuram and Kangayam. At Kangayam, in addition to the permanent stallion "Punch", two others "Ahmed" and "Ali" were sent to meet the local demand for their service. The number of coverings effected at Kangayam alone was 54 or nearly one-third of the total number for the district. Stallion "Ophir" which was posted to Dhárápuram covered 17 mares in the course of six months against 16 for the whole of last year. He was taken ill during the early part of November 1907 and had to be destroyed in January 1908.

"Hector" was permanently stationed at Kollegal and covered 20 mares against 26 in the previous year. "Jumna" whose services were required at Erode, Hosúr and Kangayam covered 17 mares and "Ali" who was stationed at Coimbatore covered 9 against 32 and 14 respectively in the previous year. "Ahmed", "Punch", "Mustapha" and "Rahiman" stationed at Kangayam, Dhárápuram, Tiruppúr and Pollachi are credited with 98 coverings against 83. The remaining two stallions "Turk" and "Sheik" covered only 17 and 7 mares respectively against 36 and 11. The decrease is due to the fact that "Turk" was taken ill at the covering season for about a fortnight and that "Sheik" worked in this district only for three months and was subsequently transferred to Madura district.

The total number of coverings effected by the 10 stallions in the Coimbatore district was 186 against 218 in the previous year. The decrease is mainly due to the fact that only six stallions worked in the district throughout the year, and of the rest "Ophir" was useless being affected with kumri and three other stallions were posted here only during the latter part of the year.

There were four stallions at work in the Salem district of which two were posted in Hosúr, one in Krishnagiri, and one in Harúr. In Hosúr "Sunshine" covered 21 mares, and "Jumna" who arrived there so late as December covered only 2. "Selim" at Krishnagiri, and "Carbon" at Harúr covered 23 and 11 mares respectively.

In Madura only two stallions "Samawy" and "Sheik" were at work. "Sheik" who had been standing at Coimbatore was transferred to Madura in October 1907. The total number of coverings effected was 41 against 22 in the year previous.

On the whole, there were 284 coverings during the year against 315 in the one previous, and the average was 21 per stallion approximately. The decrease in the total number of coverings as compared with that of last year is due to the absence of one stallion throughout the year, the frequent illness of "Turk" and the destruction of "Ophir" who suffered from incurable disease (paraphlegia).

Results of coverings.—On the whole, there were 315 coverings during the previous year in the three districts of Coimbatore, Salem and Madura.

It is to be regretted that, notwithstanding the orders of the Board of Revenue directing Revenue Inspectors to ascertain the number of foals dropped to the Government stallions, the results of these coverings were reported only in 83 cases—21 mares foaled, 12 were in foal, 32 proved empty and in 18 cases the whereabouts were not traceable. The Tahsildars concerned have been asked to make further enquiries and report on the remaining cases.

Castrations.—These operations were carried on as usual in the districts of Salem and Coimbatore by three Salustries. Salustri Sheik Ahmed was posted at Hosúr, Salem district, throughout the year, and Salustries Abdhul Rahiman and Abdhul Sathar at Dhárápuram and Kollegal taluk in the Coimbatore district. Seventy-five castrations on pony entires and 62 on bulls were performed at Hosúr. Forty-four pony entires and 120 bulls were castrated at Dhárápuram and Kollegal respectively. In all 301 castrations were performed during the year against 379 in the last year. It is gratifying to note that 119 ponies were castrated against 85 in the previous year.

IV. (*b*)—Cattle Fairs and Shows.

A large number of cattle fairs were held in several districts during the year, but only to three fairs in the Tinnevelly district—(*viz.*) the Kanniseri, Muthilapuram and Kazhugumalai—was it possible to depute a Veterinary Assistant to enforce the provisions of the Cattle Diseases Act II of 1866. From the reports submitted by the Veterinary Assistant, it would seem that upwards of 63,020 animals were gathered

for sale, that no cases of a contagious disease broke out amongst them and that in consequence there was no necessity to take action under the Act. Occasion was, however, taken to demonstrate to the people assembled the process and advantages of preventive inoculation. There were seven other more or less important fairs held in the same district, but no reports were made in consequence of the difficulty of deputing a Veterinary Assistant to look after them.

Under the auspices of the District Agricultural Associations of Madura, Coimbatore, Ganjám, Gódávari, Vizagapatam, and Guntúr, half a dozen cattle shows were organised and held respectively in Madura, Tiruppur, Berhampur, Cocanada, Kottavalsa and Ongole. Detailed reports regarding each of them having been separately submitted to the Board of Revenue, it will suffice to notice here some of their most interesting points. So far as the number and quality of the animals exhibited were concerned, it may be safely asserted that these shows have proved a success. From the breeders' point of view, the Ongole and Tiruppur shows stand out pre-eminently. At the Ongole show, all the animals exhibited were of a distinctive type and indeed this may also be said of those shown at Tiruppur. At Tiruppur there were two distinct breeds exhibited in addition to the large number of pony stock. The magnificient breed of buffaloes so carefully reared and exhibited at Kottavalsa cannot be passed over without comment as they were by far the best exhibited, and eclipsed those shown at other shows. The Maharaja of Bobbili has exhibited some of these buffaloes at several fairs, and has done much in this way to show the people to what extent fine buffaloes may be bred. Such exhibit tends to excite emulation amongst local breeders and may influence them to improve the local breed in the near future. While increasing efforts are made to improve cattle—the backbone of agriculture—it is desirable that attention should be also drawn to the encouragement of breeding and the exhibiting of wool bearing sheep.

Owing to the large purchases of the best young stock of the Ongole breed by purchasers from foreign countries, Government have recognised the advisability of purchasing some of the best male stock exhibited each year for retention in the district and thus to protect the breeder. With this object in view, eight young bulls were purchased at the last Ongole cattle show. One cost Rs. 350. Six of them were stationed in the Guntúr, one in the Vizagapatam district and one in the Madras Veterinary College. They are running loose.

V.—Veterinary Assistants.

Throughout the year six Veterinary Assistants were mainly employed in (1) attending to outbreaks of cattle disease, (2) demonstrating to ryots the benefits of preventive inoculation and (3) carrying on the work of inoculation in the villages affected with infectious disease. There were 700 outbreaks during the year, and the districts mostly affected by them were Ganjám, Gódávari Kistna, Kurnool, Bellary, Anantapur and Nellore in each of which, except Kistna, a Veterinary Assistant was permanently employed throughout the year. Reports of outbreaks from Tanjore, South Arcot, North Arcot and Chingleput were constantly received and Veterinary Assistants were temporarily deputed to combat the epidemics. It is gratifying to observe that ryots were beginning to appreciate the utility of inoculation which was carried on in a pretty large scale in 16 districts against 13 in the previous year.

The subjoined table shows the number of cattle inoculated for each disease, and statement No. III the number inoculated in each of the districts. The staff of Veterinary Assistants engaged in inoculation work has since been strengthened by the addition of 9 Veterinary graduates:—

Year.	Malignant sore throat.	Anthrax.	Rinderpest.	Hæmorrhagic septicæmia.	Total.
1905–1906	..	22,152	12,689	833	35,674
1906–1907	..	8,856	11,043	679	20,578
1907–1908	..	8,461	28,788	1,179	38,428

Senior Veterinary Assistant M. Hassen Alí Sháib visited Kurnool, Chingleput and Tinnevelly districts, and inoculated 500 cattle against rinderpest. He proceeded to Ongole to assist Mr. J. D. leik D'Castro of Brazil in the purchase of bulls and cows. To a great extent the success of the two cattle shows—one at Tiruppúr, Coimbatore district, and the other at Makkajipalli in Mysore province—was due to his energy and organisation. He was on privilege leave from 10th September to 9th October 1907 and on the 1st November his services were lent to the Corporation of Madras.

The other Senior Veterinary Assistant V. P. Subrahmania Mudaliyar was chiefly engaged in inoculation work which he rendered very popular notwithstanding the strong prejudice prevailing against it. He inoculated 6,423 animals against anthrax and 5,798 against rinderpest, making a total of 12,221, which is more than one-third of the number inoculated in the whole Presidency. He was on privilege leave for one month, and visited thirteen districts, of which eight were in connection with outbreaks and fairs, and five in connection with shows to which his time and attention were devoted in the latter part of the year. At one of the shows at Berhampur, he addressed the people assembled on "preventive inoculation and its uses" which was well appreciated. He has since been promoted to the rank of Veterinary Inspector.

Veterinary Assistant S. C. Jeyasing Raj was stationed at Bellary for the major portion of the year, but as reports of outbreaks were received from Trichinopoly and South Canara he had, in addition, to visit these districts. His services were lent to the District Board Hospital at Madura during the absence of the permanent incumbent on privilege leave for two months. He inoculated 1,233 animals on the whole and was on privilege leave for a month and a half.

Veterinary Assistant S. A. Padmanabha Pillai was engaged in the earlier part of the year in treating Government elephants. He visited Ganjám, Cuddapah and Guntúr districts, attended to outbreaks of cattle disease and inoculated 1,827 animals. On the 25th December he proceeded to Trichinopoly to relieve the Veterinary Assistant in charge of the District Board Hospital who was granted privilege leave for a month. In February 1908 he took charge of the District Board Hospital, Coimbatore.

Veterinary Assistant A. Ramalinga Mudaliyar was carrying on preventive inoculation in the Southern districts—Tinnevelly, Tanjore, Coimbatore, North Arcot and South Arcot. He also attended the cattle fair held at Kalugumalai, Tinnevelly district. The total number of inoculations performed by him was 5,511, of which 5,400 were against rinderpest and 111 against anthrax.

Veterinary Assistant A. Rajappa who was mainly engaged in inoculation work in the districts of Bellary, Kurnool, Kistna and North Arcot was deputed to Gódávari to treat the Government elephant suffering from diarrhœa.

Veterinary Assistant A. Subrahmania Aiyar was at the commencement of the year posted to Anantapur district where he carried out on a large scale the preventive inoculation against rinderpest and anthrax. He was also called upon to attend to outbreaks of cattle disease in the Kurnool, Guntúr and Cuddapah districts. He inoculated on the whole 6,957 cattle. His health having broken down, he was obliged to go on privilege leave for one month.

Veterinary Assistant M. P. Kanniah Nayudu was on duty for the most part of the year in the district of Chingleput where rinderpest broke out in a very virulent type. He also visited Kurnool and Nellore districts, and inoculated 6,097 animals, of which 914 were against anthrax, 5,183 against rinderpest.

The following doses of serum were received from the Imperial Bacteriologist during the year:—

Rinderpest	36,000
Anthrax	7,000

Madras,
1*st July* 1908.

W. D. GUNN, Lt.-Col.,
Superintendent, Civil Veterinary Department.

TABLE I.—Abstract showing main results of Veterinary Colleges and Schools during the year 1907-1908.

Veterinary College and Schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the year.		Passed final examination during the year.	Failed to pass final examination.	Remaining under instruction at the end of the year.				
		Scholarship holders.	Others.			In ordinary course.	Instruction prolonged by reason of failure.	Matriculated with higher qualifications.	Knowing English but not matriculated.	Knowing very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary College, Madras.	..	10	16	17	6	74	5	6	20	..

Veterinary College and Schools.	Receipts.			Expenditure.			Employment of students passed out during the two years preceding.				
	From fees.	From other sources.	Total.	Salaries of instruction staff.	Other expenses.	Total.	Total number passed.	In service of local bodies or Government.	In the service of other bodies.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
Veterinary College, Madras.	..	..	..	Rs. A. P. 6,686 9 8	Rs. 3,290 (stipends).	Rs. A. P. 9,976 9 8	29	20	8	..	* 1

* Died.

TABLE II.—Showing number of deaths from contagious diseases amongst animals during the year 1907–1908.

Province.	Equines.						Bovines.			
	Glanders.	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest.	Foot and mouth disease.	Hæmorrhagic Septicæmia.	Black quarter.
1	2	3	4	5	6	7	8	9	10	11
Madras Presidency ..	..	15	..	..	188	203	97,244	3,544	..	6,148

Province.	Bovines—*cont.*			Others.						
	Anthrax.	Other contagious diseases.	Total.	Rabies.	Plague.	Hæmorrhagic Septicæmia.	Gillar.	Anthrax.	Other contagious diseases.	Total.
	12	13	14	15	16	17	18	19	20	21
Madras Presidency ..	10,977	34,921	152,834	12	..	..	..	1	40	53

TABLE III.—Statement showing results of preventive inoculation during the year 1907–1908.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Ganjám	"Rinderpest."	By serum alone.	4	..	6	..	..	122	..	..	1	..
2. Vizagapatam			2	..	6	..	..	105	..	..	..	..
3. Kistna			83	..	312	..	..	2,211	..	..	..	..
4. Guntúr			12	..	235	..	..	3,073	..	..	..	..
5. Kurnool			189	..	1,826	..	..	1,839	100	..	1	..
6. Bellary			93	..	696	..	..	1,989	..	..	2	..
7. Anantapur			51	..	1,624	..	..	5,361	26	..	7	..
8. Cuddapah			63	..	341	..	..	572	..	..	..	..
9. Nellore			7	..	55	..	..	695	..	..	1	..
10. Chingleput			57	..	1,984	..	..	3,509	..	..	..	..
11. Madras			6	..	62	..	..	1,218	..	..	5	..
12. South Arcot			28	..	1,536	..	..	3,250	..	..	59	..
13. North Arcot			37	..	1,722	..	..	1,866	..	..	3	..
14. Salem			..	..	..	..	..	50	..	..	..	..
15. Tanjore			10	..	524	..	..	2,905	..	..	40	..
16. Tinnevelly			1	..	..	..	..	23	..	..	..	..
Total ..	..	..	643	..	10,929	..	..	28,788	126	..	119	..

Statement showing results of preventive inoculation during the year 1907–1908—*cont.*

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Vizagapatam	Anthrax.	By serum.	3	..	81	..	..	80	..		..	..
2. Kistna			1	..	4	..	..	129	..	..	..	..
3. Guntúr			4	..	42	..	..	752	..	..	..	..
4. Bellary			3	..	27	..	..	355	..	..	..	..
5. Nellore			3	..	10	..	.	429	..	..	..	..
6. North Arcot			2	..	46	..	..	111	..	..	..	..
7. Trichinopoly			..	..	..	..	..	205	..	..	..	..
8. Tanjore			29	..	272	..	..	6,400	..	..	79	..
		Total ..	45	..	482	..	..	8,461	..	..	79	..
1. Ganjám	Hæmorrhagic Septicæmia.	By serum alone.	8	..	14	..	..	330	..	..	..	..
2. Guntúr			4	..	43	..	..	849	..	..	..	..
		Total ..	12	..	57	..	..	1,179	..	..	..	..

TABLE IV.—Abstract showing the number of animals treated and castrated by Veterinary Assistants and Salustries on tour during the year 1907–1908.

Province.	Number of villages visited.	Number of veterinary assistants or salustries employed.	Castrations performed.				Treated for contagious diseases.				Treated for non-contagious diseases.				Total number of cases treated and castrations performed.
			Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Madras	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Veterinary Assistants	..	* 8	..	..	..	..	..	..	..	..	..	..	..	..	..
Salustries	..	3	119	182	..	301	..	..	..	..	..	..	..	..	301

* Veterinary Assistants on tour are engaged in inoculation work.

TABLE V.—Statement showing the number of animals treated at Veterinary Hospitals during 1907–1908.

Province.	Number of veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients.											
			Remaining on 1st April 1907.			Admitted during the year.			Total.			Discharged during the year.		
			Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Madras ..	1	4	16	16	15	540	164	352	556	180	367	531	158	243
Saidapet ..	1	1	8	2	4	111	93	77	119	95	81	112	94	74
Vellore ..	1	1	..	..	..	25	9	7	25	9	7	19	9	7
Madura ..	1	1	2	..	..	44	25	11	46	25	11	39	22	10
Trichinopoly ..	1	1	9	12	4	299	332	194	308	344	198	296	329	193
Coimbatore ..	1	..	..	..	..	155	99	50	155	99	50	145	95	45
Vizianagram ..	1	1	..	..	..	10	16	6	10	16	6	7	16	6
Vizagapatam ..	1	1	.	..	..	11	9	7	11	9	7	11	9	4
Pithápuram ..	1	1	1	1	..	13	..	1	14	1	1	14	1	1
Bellary ..	1	1	1	12	31	80	177	84	81	189	115	77	178	111
Pudukkóttai ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	11	14	37	43	54	1,288	924	789	1,325	967	843	1,251	911	695

Province.	In-patients —*cont.*			Out-patients.													
	Balance on 31st March 1908.			Number treated during the year.			Average daily attendance.			Total number of in- and out-patients treated during the year.							
	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Total.	Receipts.			Expenditure.		
														RS.	A.	P.	RS.	A.	P.
16	17	18	19	20	21	22	23	24	25	26	27	28	29			30		
Madras ..	25	22	125	353	102	755	6	3	14	909	282	1,122	2,313	8,438	3	2	15,862	1	11
Saidapet ..	7	1	5	294	535	290	4·8	10·7	4·1	413	630	371	1,414	2,677	0	0	1,474	8	8
Vellore ..	6	..	..	147	94	110	12·6	6·8	5·5	172	103	117	392	7	12	10	822	7	11
Madura ..	7	3	1	379	590	218	12·2	13·7	4·6	425	615	229	1,269	269	0	0	1,845	0	0
Trichinopoly ..	12	15	5	4,701	7,522	984	13	21	3	5,009	7,866	1,182	14,057	1,013	10	0	2,521	2	11
Coimbatore ..	10	4	5	1,442	925	332	9	6	2	1,597	1,024	382	3,003	..			566	2	6
Vizianagram ..	3	..	..	226	79	44	12	2	2	236	95	50	381	2,551	8	0	1,712	4	5
Vizagapatam ..	..	..	3	119	99	203	5·8	3·6	6·8	130	108	210	448	2,030	0	0	1,077	3	7
Pithápuram ..	..	..	..	172	568	358	·4	1·5	·9	186	569	359	1,114	..			1,539	0	0
Bellary ..	4	11	4	411	712	396	14·2	25·1	10·7	492	901	511	1,904	2,519	13	10	2,519	13	10
Pudukkóttai ..	..	..	..	314	1,425	214	2	10·7	1·6	314	1,425	214	1,953	10	6	0	2,100	0	0
Total ..	74	56	148	8,558	12,651	3,904	92·0	104·1	55·2	9,883	13,618	4,747	28,248	19,517	5	10	32,039	13	9

TABLE VI.—Abstract showing receipts and expenditure of Veterinary Dispensaries during 1907–1908.

Province.	Receipts.						
	Last year's balance.	By local fund grants.	By Government grants.	By municipal contributions.	By fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.	Rs. A. P.	Rs. A. P.
1. Madras	— 387 13 0	..	..	..	8,438 3 2	..	8,438 3 2
2. Saidapet	*	..	1,698 10 8	..	879 12 10	98 8 6	2,677 0 0
3. Vellore	*Nil.*	..	..	..	6 8 10	1 4 0	7 12 10
4. Madura	124 12 2	..	..	..	269 0 0	..	269 0 0
5. Trichinopoly	*	..	..	..	1,013 10 0	..	1,013 10 0
6. Coimbatore ..	*Nil.*	..		..	..	..	..
7. Vizianagram	*Nil.*	2,500 0 0	..	..	51 8 0	..	2,551 8 0
8. Vizagapatam	*Nil.*	2,000 0 0	..	..	..	30 0 0	2,030 0 0
9. Pithápuram	*	..	..	..	..	..	..
10. Bellary	*	1,095 4 7	360 0 0	..	397 7 3	667 2 0	2,519 13 10
11. Pudukkóttai	*Nil.*	..	..	..	10 6 0	..	10 6 0
Total ..	..	5,595 4 7	2,058 10 8	..	11,066 8 1	796 14 6	19,517 5 10

Province.	Expenditure.						Balance.
	Pay.	Travelling allowance.	Medicines and instruments.	Furniture.	Contingencies.	Total.	
	9	10	11	12	13	14	15
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1. Madras	11,555 11 9	100 8 0	1,196 11 9	411 7 11	2,597 10 6	15,862 1 11	— 7,811 11 9
2. Saidapet	552 14 7	..	516 14 6	..	404 11 7	1,474 8 8	1,202 7 0
3. Vellore	433 15 10	..	..	208 9 0	179 15 1	822 7 11	— 814 11 1
4. Madura	1,448 0 0	..	236 0 0	..	161 0 0	1,845 0 0	*
5. Trichinopoly	1,598 12 0	244 0 0	..	..	678 6 11	2,521 2 11	*
6. Coimbatore	304 0 0	..	188 2 6	20 0 0	54 0 0	566 2 6	..
7. Vizianagram	667 9 11	65 11 0	835 12 0	14 11 0	128 8 6	1,712 4 5	839 3 7
8. Vizagapatam	623 15 1	5 5 6	69 10 0	308 8 10	54 12 2	{ 1,062 3 7 / †+15 0 0 }	952 12 5
9. Pithápuram	948 0 0	..	421 0 0	..	170 0 0	1,539 0 0	*
10. Bellary	1,425 12 6	..	94 1 0	527 5 6	472 10 10	2,519 13 1	*
11. Pudukkóttai	945 5 4	17 8 0	818 10 0	240 14 8	77 10 0	2,100 0 0	*
Total ..	20,504 1 0	438 0 6	4,376 13 9	1,731 8 11	4,979 5 7	{ 32,024 13 9 / †+ 15 0 0 }	

* The opening and closing balances are not reported.

† Visiting fee

TABLE VII.—Statement showing strength of subordinate Veterinary staff employed during the year 1907–1908.

Province.	How occupied.	Whether paid from Provincial or Local funds.	Veterinary Inspector.	Veterinary Assistant.	Subordinate staff not included in previous columns.	Remarks.
1	2	3	4	5	6	7
Madras ..	Itenerating and attending cattle fairs and shows.	Provincial ..	1	* 17	..	* No. 17 includes senior Veterinary assistant Hassan Ali Sahib, whose services were lent to the Municipality in 1st November 1907.
	In charge of hospitals.	Local Fund ..	..	6	..	
		Rajas ..	..	3	..	
		Society for the Prevention of Cruelty to Animals, Bellary.	..	1	..	
	College work ..	Provincial ..	..	..	† 4	† One Assistant Principal and three Lecturers.
		Total ..	1	27	4	

TABLE VIII.—Return of stud bulls for the year 1907–1908.

Province.	Property of Government.					Property of local bodies.				
	Number on 1st April 1907.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1908.	Number on 1st April 1907.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1908.
		No.	Average price paid.				No.	Average price paid.		
1	2.	3	4	5	6	7	8	9	10	11
Madras	6	13	RS. 108	*Nil.*	19	..	..	..	..	..

REMARKS.—The bulls are posted thus—Four at Tinnevelly district, twelve at Guntúr, one at Vizagapatam and two at the Madras Veterinary College.

TABLE IX.—Statement showing main results of the working of Provincial Cattle Farm during the year 1907–1908—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions under local bodies for the year 1907–1908.

	NO.
Arab	* 14

The stallions at stud are under the Provincial Department of Government.

* One stallion was destroyed in January 1908.

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions under local bodies during the year 1907–1908.

Horse, pony or donkey.	Province.	Stallions on register on 31st March 1908.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
Pony	Madras ..	13	* 14	14	284	315	21	22	* One of the stallions "Ophir" was destroyed in January 1908.

N.B.—The stallions at stud are under the Provincial Department of Government.

TABLE XII.—Average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1907–1908.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	Rs. A. P. 23 6 2	Rs. A. P. 24 14 7	..	..	The total expenditure for upkeep alone of 13 Government stallions for the whole year and one for ten months amounted to Rs. 3,882–0–3. Report from Madura having since been received, the figures have been included in the statement.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year 1907–1908—*Nil.*

TABLE XIV.—Abstract of particulars regarding Cattle Fair and Shows held during the year 1907–1908.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animals sold.				
		Bulls	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Tinnevelly Cattle Fairs.									RS.				
1. Kanniseri	1	..	17,000	200	500	20	..	..	Information not available.				
2. Muthilapuram ..	1	50	18,000	150	1,000	800	..	..					
3. Kazhugumalai ..	1	..	25,000	50	..	250	..	..					
Cattle Shows.													
1. Madura	1	69	138	4	..	..	..	..	..	..	..	..	..
2. Tiruppúr	1	(1,918) cattle and 196 ponies.								..	..	..	..
3. Berhampúr	1	15	127	33	..	45	..	24	..	..	..	..	..
4. Cocanada	1	19	52	28	18	85	..	27	..	..	..	..	..
5. Kotavalsa	1	87	190	20	..	101	..	8	..	..	..	75	..
6. Ongole	1	225	45	445	..	58	..	88	206	..	..	..	..
Total ..	9	465	62,470	930	1,518	1,359	..	343	206	..	..	75	..

—	Amount realised in fees.	Total number of animals that competed for prizes.	Prizes awarded.						Number of medals.	Remarks.
			From Imperial Funds.	From Provincial Funds.	From Local bodies.	From other sources.	Total.	Amount actually awarded.		
	15	16	17	18	19	20	21	22	23	24
Tinnevelly Cattle Fairs.	RS. A.	RS.	RS.		RS. A.		RS. A. P.	RS. A. P.		
1. Kanniseri	Information not available.									
2. Muthilapuram ..										
3. Kazhugumalai ..										
Cattle Shows.										
1. Madura	..	211	300	..	436 0	10	746 0 0	424 13 6	1	Silver medal.
2. Tiruppúr	..	2,114	..	..	..	..	..	1,311 0 0	2	Do.
3. Berhampúr	..	244	..	..	..	..	..	862 0 0	4	Do.
4. Cocanada	..	229	500	..	600 0	..	1,100 0 0	1,197 0 0	10	4 gold and 6 silver and 1 silver cup.
5. Kotavalsa	38 0	406	500	..	300 0	684	1,484 0 0	1,019 0 0	7	1 gold and 6 silver.
6. Ongole	340 8	861	1,000	..	2,609 12	..	3,609 12 0	2,513 0 0	1	Gold medal (Canadian).
Total ..	378 8	4,065	2,300	..	3,945 12	694	6,939 12 0	7,326 13 6	25	

TABLE XIV (*a*).—Statement showing the cost of the Civil Veterinary Department during the official year 1907–1908.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
1	2	3	4	5
	RS. A. P.	RS. A. P.		RS. A. P.
Salaries of officers	36,245 2 10	..	..	36,245 2 10
Do. of subordinates	*Nil.*	6,919 13 5	..	6,919 13 5
Travelling allowance of officers	..	2,900 12 0	..	2,900 12 0
Do. of the subordinates	..	3,939 7 6	..	3,939 7 6
Other allowances	..	600 0 0	..	600 0 0
Supplies and services	..	76 4 0	..	76 4 0
Contingencies	..	5,250 6 2	..	5,250 6 2
Prevention of diseases	..	..	..	..
Schools and colleges	..	19,567 5 0	..	19,567 5 0
Prizes at fairs and shows	1,500 0 0	..	..	1,500 0 0
Total	37,745 2 10	39,254 0 1	..	76,999 2 11

TABLE XV.—Comparative statement of cattle mortality for five years ending 1907–1908.

Causes of death.	Number of deaths among cattle for the official year 1907–1908.				
	1903–1904.	1904–1905.	1905–1906.	1906–1907.	1907–1908.
Rinderpest, diarrhœa and dysentery	17,655	19,772	19,050	31,611	97,244
Anthrax	16,887	14,996	13,474	12,082	10,977
Malignant sore-throat	13,769	11,317	8,838	9,086	7,190
Black quarter	7,616	7,683	5,952	4,168	6,148
Epizootic aphtha	4,683	2,767	4,074	2,794	3,544
Others	32,548	33,336	38,905	53,798	27,731
Total	93,158	89,871	90,293	113,539	152,834
Snake bite	2,278	2,257	2,011	1,899	1,885
Wild animals	10,886	12,061	13,232	13,372	12,611
Criminal poisoning	71	52	58	43	56
Total	13,235	14,370	15,301	15,314	14,552
Grand total	106,393	104,241	105,594	128,853	167,386

TABLE XVI.—Statistics of mortality among Cattle, Horses and Ponies in the several districts of the Madras Presidency during the year 1907–1908.

Districts.	Number of deaths among Cattle										
	From Diseases.								From snake-bite.	By wild animals.	From criminal poisoning.
	Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.			
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám	2,790	..	528	547	355	1,277	1,041	6,538	69	211	..
2. Vizagapatam	977	..	547	311	167	69	432	2,503	36	69	..
3. Gódávari	654	..	1,017	144	84	116	2,116	4,131	84	151	7
4. Kistna	3,342	..	1,567	1,241	172	271	2,752	9,345	237	46	11
5. Guntúr	1,165	..	184	1,077	202	54	519	3,201	43	15	5
6. Kurnool	8,865	..	810	236	570	105	3,397	13,983	78	393	..
7. Bellary	7,289	..	726	330	445	157	2,389	11,336	16	171	2
8. Anantapur	8,677	..	354	333	845	318	2,423	12,950	41	222	2
9. Cuddapah	4,765	..	547	238	1,835	144	1,088	8,617	50	574	2
10. Nellore	3,222	..	849	519	301	156	2,122	7,169	194	109	8
11. Chingleput	14,430	..	531	153	17	58	527	15,716	105	14	2
12. South Arcot	21,544	..	712	156	179	118	2,973	25,682	136	192	2
13. North Arcot	12,202	..	438	301	392	106	949	14,388	251	716	1
14. Salem	300	..	88	70	128	53	414	1,053	32	235	1
15. Coimbatore	692	..	127	98	128	239	811	2,095	50	961	3
16. Trichinopoly	378	..	281	106	28	38	1,246	2,077	69	39	1
17. Tanjore	2,798	..	511	479	79	34	298	4,199	91	..	..
18. Madura	1,014	..	740	211	202	2	909	3,078	122	132	2
19. Tinnevelly	284	..	239	102	..	3	490	1,118	97	78	7
20. Nilgiris	35	..	3	296	8	41	60	443	4	287	..
21. Malabar	279	..	52	223	3	167	122	846	67	2,605	..
22. South Canara	1,542	..	126	19	8	18	653	2,366	13	5,391	..
Total ..	97,244	..	10,977	7,190	6,148	3,544	27,731	152,834	1,885	12,611	56

Districts.	Number of deaths among—*cont.*											
	Cattle—*cont.*			Horses and ponies.								
				From diseases.								
	Total.	Grand total.	Total stock by the latest census.	Diarrhœa and Dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.
	13	14	15	16	17	18	19	20	21	22	23	24
1. Ganjám	280	6,818	..	..	..	..	..	..	1	..	1	1
2. Vizagapatam	105	2,608	..	..	..	3	3	..	..	..	..	3
3. Gódávari	242	4,373	..	2	2	18	22	1	1	..	2	24
4. Kistna	294	9,639	..	1	4	31	36	2	..	..	2	38
5. Guntúr	63	3,264	..	1	1	1	3	1	..	..	1	4
6. Kurnool	471	14,454	..	..	1	13	14	..	8	..	8	22
7. Bellary	189	11,525	..	2	2	28	32	2	8	..	10	42
8. Anantapur	265	13,215	..	2	..	20	22	..	12	..	12	34
9. Cuddapah	626	9,243	..	3	..	4	7	1	..	..	1	8
10. Nellore	311	7,480	..	..	..	15	15	..	..	..	..	15
11. Chingleput	121	15,837	..	..	..	1	1	..	..	..	..	1
12. South Arcot	330	26,012	..	..	1	5	6	..	1	..	1	7
13. North Arcot	968	15,356	..	..	..	..	..	..	3	..	3	3
14. Salem	268	1,321	..	..	..	1	1	1	1	..	2	3
15. Coimbatore	1,014	3,109	..	2	1	7	10	3	8	..	11	21
16. Trichinopoly	109	2,186	..	..	..	7	7	..	..	..	..	7
17. Tanjore	91	4,290	..	..	..	1	1	..	..	..	..	1
18. Madura	256	3,334	..	1	2	13	16	3	34	..	37	53
19. Tinnevelly	182	1,300	..	..	1	1	2	..	..	..	..	2
20. Nilgiris	291	734	..	1	..	2	3	..	23	..	23	26
21. Malabar	2,672	3,518	..	1	..	1	2	..	..	..	..	2
22. South Canara	5,404	7,770	..	..	..	..	..	..	..	..	..	..
Total ..	14,552	167,386	..	16	15	172	203	14	100	..	114	317

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., Sur., L.R. and Agri.), No. 279, dated 28th July 1908.

The Hon'ble Mr. J. TWIGG.

The reports of the Director of Agriculture and the Superintendent, Civil Veterinary Department, on the operations of their respective departments for the year 1907–1908 will be submitted to Government.

2. *Agricultural stations.*—The Director's report shows a record of good work done during the year by the two Deputy Directors of Agriculture and by Mr. Shepperson on the farms under their charge. No new agricultural stations were opened during the year. The management of the ten existing stations occupied most of the time of the Deputy Directors, but the Director expresses the hope that when the managers of these stations gain more experience, less supervision will be required and the two Deputy Directors may be able to devote more time to touring in the districts. The season at the Bellary farm was not favourable, but at the remaining stations useful experimental and demonstration work was carried on during the year. Experiments towards improving the cultivation of cotton were continued at Nandyal, Koilpatti and Hagari. The results at Koilpatti were particularly gratifying. The system introduced in the Kurnool and Cuddapah districts of paying a premium of two annas per acre to ryots who had grown pure cotton has not met with much success, the extent on which such premia were paid during the year 1907–1908 being only ·54 per cent. of the total area under cotton in the tracts concerned. The continuance of the experiment for another year has been sanctioned. The Board is glad to note that the sugarcane experiments conducted at the farms at Samalkotta in Gódávari and at Palur in South Arcot have so far succeeded that the cultivation of the new varieties is spreading rapidly. As a result of the successful cultivation of the cane in a small plot of land at the Taliparamba farm, 79 applications for cane sets were received from people in Malabar who wished to grow the canes. The experiments should be continued and the ryots encouraged to grow the crop for which the climate and conditions of the district seem to be favourable. Improvements in paddy cultivation were attempted on all the wet land farms. As a result of further investigation into the prospects of agave cultivation at Hindupur, it was decided to persevere with the experiments, the aim of which is to introduce fibre-making from agave as a cottage industry of the district. The Attur station which was started with the object of conducting a thorough trial of perennial and exotic cottons under irrigation and the growth of fodder crops was found to be unsuited to the experiments and it has therefore been decided to abandon it.

3. *Agricultural instruction.*—The College and farm at Saidapet were closed at the end of the calendar year and the new College at Coimbatore was opened in June last. The required buildings at the latter station are still unfinished, but it is hoped that they will shortly be completed and handed over to the Agricultural department. Four managers of agricultural stations were sent during the year to the United

Provinces to undergo a course of training in Mr. Hadi's improved method of sugar-making. Apprentices sent either by District Agricultural Associations or by private individuals were freely received at the Government farms. The object and scope of the several farms were also explained to the ryots who visited them and every facility was afforded to the visitors to understand the work carried on there.

4. *Agricultural associations and exhibitions.*—The Board notes with satisfaction the useful work done by the Agricultural Associations in the several districts. Cattle and agricultural shows were held during the year in the districts of Ganjám, Vizagapatam, Gódávari, Guntúr, Coimbatore, Madura and Trichinopoly.

5. The Government Botanist (Dr. C. A. Barber) was on leave throughout the year. During his absence the appointment was held by M.R.Ry. Rao Bahadur C. K. Subba Rao, whose untimely death which occurred after the close of the year is a heavy loss to the department. Extensive operations for the eradication of palm disease in Gódávari were carried out by the Assistant in Mycology and the special Revenue staff during the year, but as it is reported that the disease spreads most rapidly during the rains, the results of the preventive measures adopted can be judged only after the rains set in. Dr. Butler visited the scene of operations twice during the year and also paid a visit to the Native State of Travancore for the investigation of an obscure disease from which the cocoanut gardens in the State were reported to be suffering. In this connection, the Board begs to endorse the Director's remark in paragraph 10 of his report regarding the need for an European Provincial Mycologist to carry on systematic research in Madras. In paragraph 7 of his Despatch to the Government of India No. 226, Revenue, dated 14th December 1906, which is among the papers printed in G.O., No. 910, Revenue, dated 20th April 1907, the Secretary of State for India expressed his inability to sanction the local Government's recommendations on the subject and considered that the Botanical Department at Pusa should in time be able to provide competent Mycologists to be attached to the several Provinces. The interests at stake in Gódávari and elsewhere are, however, so important that the Board would suggest that the request for the appointment of a Mycologist for Madras might be renewed.

6. *Pumping experiments.*—The conduct of the experiments continued as in the preceding year under the control of Mr. Chatterton, Director of Industrial and Technical Inquiries, to whom the direction of the boring operations in the Tiruvallúr and Ponnéri taluks of the Chingleput district was also transferred. The total number of engines and pumps which were at work or in course of erection in the last year was 54; and during the year 40 engines were newly installed. The result is extremely satisfactory. Land improvement loans for the purpose of setting up oil-engines and pumps to the value of Rs. 22,000 were paid to 8 individuals against Rs. 19,500 paid to 6 persons in the preceding year. The tables showing the depths at which sub-artesian supply was tapped in wells and the particulars as to the cost of borings at different depths furnished by Mr. Chatterton are full of interest. The Board hopes to receive from Mr. Chatterton after the end of September next a special report on the boring operations carried on by him.

7. *Meteorology.*—The rainfall registered at the various raingauge stations was tabulated as usual and the results published by the Meteorologist, Madras, and Deputy Director of the Madras Observatory. The total number of stations in the Presidency at the end of the official year 1907–1908 was 470, inclusive of 79 in the Native States, or 5 more than at the end of the previous year and of these, 362 stations were inspected.

8. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction (1) Monthly season reports in three sections (rainfall, cultivation and prices of food-grains and salt); (2) annual crop forecast reports in respect of cotton, paddy, ground-nut and gingelly and (3) quarterly reports of cattle mortality.

9. *The Madras Agri-Horticultural Society.*—The income of the Society from various sources including the Government grant of Rs. 4,000 amounted to Rupees 16,407–5–0. The annual flower show was held on the 25th January 1908 at the nursery gardens of the Society.

10. *Civil Veterinary Department—the Madras Veterinary College.*—The work of the College during the year was satisfactory. The Board is glad to note that the Board of Examiners found that the theoretical knowledge possessed by the students was above the average and that their practical knowledge was also very fair. With reference to the Superintendent's remark about the paucity of applications from passed candidates for admission to the College, Government have recently passed orders directing that the course of instruction at the College and the prospects of students should be specially brought to the notice of educational institutions in the Presidency.

11. *Veterinary dispensaries and the Veterinary practising staff.*—Five new dispensaries were started during the year making a total of 11 dispensaries at work at the close of the year. Of these, two—those at Madras and Chingleput—are maintained by the Government, five by District Boards, two by Zamindars, one by a Native State, and one by the Society for the Prevention of Cruelty to Animals at Bellary. The work of the practising staff was satisfactory and the figures furnished by the Superintendent go to show that ryots are beginning to appreciate the work done by these officers. The number of cattle inoculated during the year was 38,428 against 20,578 in the preceding year.

12. *Pony breeding operations.*—The work of the Government stallions during the year fell short of that reported for the preceding year. The Superintendent explains the special causes which led to this low result, but after every allowance is made, the results achieved must be declared to be unsatisfactory. The period of five years for which the continuance of the operations on revised lines was sanctioned in B.P., No. 90, dated 18th March 1903, recorded in Government Order, No. 421, Revenue, dated 24th April 1903, has expired and the question of the further continuance of the operations is being examined and will be reported for orders separately.

13. *Cattle Fairs and Shows.*—Cattle shows have not increased in number but the six that were held at Madura, Tirupur, Berhampur, Cocanada, Kottavalsa and Ongole are said to have been a success as regards the number and quality of the exhibit.

14. *Breeding bulls.*—In addition to the six bulls which were at work during the preceding year, 13 new bulls were purchased during 1907–1908. The Superintendent's report makes no mention of the work done by the Government bulls during the year. His attention will in this connection be drawn to the Board's remarks in paragraph 17 of the last year's review and to the instructions contained in paragraph 2 of B.P., Mis. No. 2547, dated 6th June 1908, and he will be requested to see that a brief statement of the work of these bulls is inserted in the annual reports of future years.

(True Extract.)

L. D. SWAMIKANNU,
Secretary.

To the Secretary to Government (Revenue Department) with one copy of the Agricultural calendar for 1908.
" Director of Agriculture.
" Superintendent, Civil Veterinary Department.
" Director of Industrial and Technical Inquiries.

Order—No. 2516, Revenue, dated 9th September 1908.

Miscellaneous.	Recorded.

2. The report, which embodies the result of the second year's working of the Agricultural Department since its reorganization, shows that it was still, more or less, in a state of transition and that the energies of its officers during the year had largely

to be devoted to the work of organization. The Agricultural College at Saidapet was closed at the end of December 1907, but it was not possible to commence teaching immediately at the new Agricultural College at Coimbatore, as the buildings there had not yet been sufficiently completed. The College was opened in June 1908 after the close of the year to which the report relates.

3. No new agricultural stations were opened during the year, but much useful work was done at the ten stations already in existence under the supervision of the Principal of the Agricultural College and the two Deputy Directors. The season was fairly favourable in all stations except Bellary, where, owing to the failure of the rains, no experimental work was successful, and valuable results were obtained from several of the experiments made, especially at the Koilpatti Agricultural station and at the Central Farm. Thus, it has been established there that for cotton cultivation properly conserved cattle manure which is within the ryots' reach gives results as good as or superior to those obtained by the use of expensive artificial manures. Experiments both at Koilpatti and Coimbatore indicate that the ridge and furrow system of irrigation of lands under wells is more economical of water than the usual method of flat bed cultivation and that seed selection coupled with careful cultivation produces crops which are less affected by insect pests and other diseases than others. The system of cultivation carried on at the Koilpatti Agricultural station with the use of the blade cultivator, seed-drill and bullock-hoe has aroused considerable interest among the neighbouring ryots owing to the excellence of the crops produced by their aid. Arrangements have been made to extend the system by making the implements used and the services of persons experienced in their working available on the ryots' own holdings. The introduction of fresh crops has been carried on with some success, ground-nut having been introduced in several districts, sugarcane in others, and steps to introduce jute being in progress. The discovery by Mr. Sampson of the jute plant growing wild in South Canara may lead to important results.

4. The Government are glad to observe that useful work is being done by several of the Agricultural Associations, especially the Ganjám Association and the Kumbakónam Association.

5. The efforts of Mr. Chatterton resulted in a very satisfactory increase during the year in the number of oil-engines and pumps used for irrigation purposes. Forty new engines were installed during the year against ten installations in the preceding year and a total number of 94 installations were at work or in the course of erection at the end of the year.

6. The sanction of the Secretary of State for the reorganization of the Veterinary Department was received early in the year. The staff was accordingly strengthened by the appointment of thirteen Veterinary Assistants from among the students who graduated during the year from the Madras Veterinary College. The full sanctioned staff of the department cannot, however, be employed until a sufficient number of students have passed out of the College. There were six Veterinary hospitals at the commencement of the year and five more were opened during the year. The Government are pleased to note an increase in the total number of animals treated during the year. The contrast between the number of patients received at the Trichinopoly hospital and that treated in all other Veterinary hospitals is very striking, and suggests that there is great room for increased efficiency at all the institutions other than Trichinopoly. The falling-off in the numbers treated at the Madura hospital is especially unsatisfactory, as that hospital has been in existence for some years. There was a large increase in the number of cattle inoculated for disease, and if the figures of deaths among inoculated cattle convey a correct impression of the results, they were eminently successful.

7. Six cattle shows were held during the year and were on the whole successful. The exhibits shown were in most cases of high quality.

8. The Board of Revenue is requested to address Government separately with reference to the appointment of a Mycologist for this Presidency.

9. The Government consider that the Director of Agriculture is to be congratulated on the steady progress shown by the department in all directions throughout the year.

(True Extract.)

A. G. CARDEW,
Secretary to Government.

To the Board of Revenue (Revenue Settlement).
„ the Public Department.
„ the Educational Department.
„ the Local and Municipal Department.
„ the Inspector-General of Agriculture.
„ the Inspector-General, Civil Veterinary Department.
„ the Minister of Agriculture, Argentine Republic.
„ the Entomologist to the Government of India.
„ the Mycologist to the Government of India.
„ Monsieur Chailley Bert.

Copy to the Government of India, Department of Revenue and Agriculture (with C.L.)
Editors' Table.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1908-1909.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1909.

Maximum number of pages prescribed—

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Administrative report of the Agricultural stations	
Government Botanist's report	4
Report on the College of Agriculture, Coimbatore ..	
Civil Veterinary Department	

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I

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1908-1909.

I.—STAFF.

With the arrival of the Government Botanist from furlough in September, the Coimbatore staff was completed. In the interval between the death of Rao Bahadur C. K. Subba Rao Avargal, referred to in paragraph 2 of last year's report, and Dr. Barber's arrival from England, the Principal of the Agricultural College was in charge of the Government Botanist's office. Until March 15th, the Government Botanist's head-quarters were in Madras pending the completion of his bungalow and office. Since the death of Rao Bahadur C. K. Subba Rao the post of Sub-Assistant Director has been vacant, and was abolished by Government in G.O., No. 1410, Revenue, dated 21st May 1909. Proposals have been submitted for the creation of two posts of Assistant Deputy Directors on Rs. 250—15—400. As the work of the department increases, the need for these appointments is increasingly felt.

2. The Director of Agriculture spent 194 days on tour, visiting the Agricultural Stations and making other local enquiries. He attended the Industrial Conference at Ootacamund in September and the Board of Agriculture at Nagpur in February.

3. Four new posts of Assistant Managers were sanctioned in G.O., No. 40, Revenue, dated 6th January 1909, but at present no suitable qualified men have offered themselves. One Assistant Manager has obtained an appointment under the Collector of Kistna as Manager of a Court of Wards' farm and another in the Forest Department. There are thus now ten vacancies in the sanctioned staff of the department which there is no prospect of filling up till the first batch of students complete their training at Coimbatore.

The Imperial Cotton Specialist made a short tour in the Presidency and visited the Koilpatti and Coimbatore farms.

II.—SCIENTIFIC AND NATIONAL ENQUIRY.

A.—Entomology.

4. Since the opening of the Coimbatore College in June last one of the Entomological Assistants has been stationed at Coimbatore and teaching Entomology. During the absence of Dr. Barber on leave the Imperial Entomologist has been directing the work of the Entomological Assistants and has very kindly revised the lectures of the teaching Assistant. The monthly diaries of both Assistants are being sent to him.

5. The two Assistants were deputed to attend a course of instruction at Pusa from March 15th to 30th to review the past year's work with Mr. Lefroy, to arrange for the work for the coming year, and to undergo a course of training in the rearing of Eri silk-worms—a promising cottage industry—the prospects of which are being investigated at Pusa.

6. The entertainment of a third Entomological Assistant was sanctioned in G.O., No. 316 P., dated 5th February, and he was deputed to Pusa for one year's training under Mr. Lefroy from June 1st.

B.—Mycology.

7. The Mycological Assistant, who had been working in the Gódávari Delta in connection with the palmyra disease, was deputed to Pusa for training under the Imperial Mycologist in November last. The difficulties experienced in dealing with this disease without adequate scientific advice have emphasised the need for a Provincial Mycologist. A proposal has accordingly been submitted to Government that the application for a Provincial Mycologist originally made in 1905 should be renewed.

8. In February the Imperial Mycologist and his Assistant visited the Amalapuram taluk and inspected the work going on there. In his report which has been submitted to Government, he expressed his opinion that the operations were having a well-marked effect in reducing the amount of disease. The latest reports are very satisfactory and show that the persistent cutting down of affected trees is eradicating the disease in Gódávari. Sporadic outbreaks having been reported from the adjacent taluks of the Kistna district, application has been made for the employment of a small special staff to deal with them.

9. Experience shows that in dry weather the fungus often remain in a dormant condition for considerable periods. With the return of wet weather it starts growing again. This explains the reappearance of the disease in localities from which it was believed to have been extirpated. It will, therefore, be necessary to maintain, for some time, a small inspecting staff to deal with such fresh outbreaks. Much credit is due to Mr. Green for the efficient arrangements he has made for dealing with the disease and the energy he has shown in inspecting and supervising the work. The total cost of the operations during the year was Rs. 14,109-6-9.

10. *Travancore cocoanut palm disease.*—The recommendations made by the Imperial Mycologist as a result of his enquiry in 1907 were communicated to the Collectors of the West Coast districts and to the Resident in Cochin and Travancore. A short pamphlet describing the symptoms and the steps to be taken to prevent the spread of the disease was also prepared by Dr. Butler and widely circulated on the West Coast. The Travancore Darbar has prohibited the export of cocoanut seedlings and roots to Cochin and Malabar, to prevent the fungus being introduced into new tracts. As the disease is a very slow-spreading one, it is hoped, by this means, that it will be possible to prevent its introduction into British India or at least to check it on its first appearance.

C.—Seed and Other Products Supplied To and Received From Other Provinces and Abroad.

11. Some of the varieties of cow-peas received from America in 1907, which did not do well in the first season, have shown good results this year at Koilpatti.

New importations include Pearl Millet (*Pennisetum spicatum*) (cumbu) from the Transvaal, and Brazilian flour — corn, maize, and ragi. The cumbu and maize have done well so far, but the ragi was disappointing. A small quantity of ninety-day maize was received from the Hawkesbury College, New South Wales, and this will be tried during the present season. The fine ears of the imported cumbu attracted the attention of the ryots round the Palur farm, and small quantities have been distributed.

A selection of Madras millets was sent to the Director of Agriculture of the Transvaal in return.

An application was received from the Rhodesian Department of Agriculture for the seeds of *Pinus excelsa*, *Cedrela* Toona, *Cedrus deodara* and *Dalbergia* Sissoo, and the Forest Department was asked to supply these. Varieties of canes grown at Samalkota were sent to Peshawar and the Louisiana State University.

Varieties of Madras paddies were supplied to Spain, Uganda and the Bombay Agricultural Department, and some pepper cuttings to Java.

Other importations were a small quantity of "American Long Red" and "Golden Drop" chilly seed from Natal for trial in Parlákimedi, and Soy beans from Japan. Dhulia onion seed from Bombay were tried on the Koilpatti Farm and gave an excellent crop of 11,125 lbs. per acre against 5,819 lbs. yielded by the local variety. If they fetch as good a price as the local onions, the new variety will be a valuable introduction, as there is a large export trade in onions from the Tinnevelly district.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

A.—Buildings and Laying Out of Farms.

12. The Coimbatore College is finished and will be formally opened by His Excellency the Governor in July. Some of the hostels for students are still unfinished but arrangements have been made to accommodate the second year's students. The Chemical Laboratories are complete and were occupied by the Agricultural Chemist in March. Sanction for the Pot culture house has not yet been received.

All the College staff are now living in the quarters provided for them on the farm. It has been found necessary to widen the Lawley Road in consequence of increased traffic. The avenue trees planted on either side are growing well, and the road will soon present a fine appearance.

The Botanical garden on the Central Farm is being laid out and a new well dug to provide it with water.

13. In G.O., No. 1234, Revenue, of 4th May 1908, Government approved the abandonment of the Attur farm as it appeared that the work there was not likely to lead to any results of practical or scientific value.

14. Plans and estimates have been sanctioned for the construction of a seed store at Koilpatti.

B.—Crops.

15. The administrative reports printed as an appendix to this report, and the separate Scientific Reports of each Agricultural Station give details of the work done at each station. The following is a short summary of the chief results.

16. *Sugar-cane introduction.*—Both in the Gódávari and South Arcot districts the new Mauritius canes introduced by the Government Botanist are rapidly ousting the inferior local canes grown before. In the former district it has been decided to give up growing the Mauritius canes for distribution in the district, as ryots can now always get them from their neighbours. In South Arcot Messrs. Parry & Co. planted a few acres of Mauritius cane on wet and dry land. The dry land canes watered by an oil-engine gave excellent results, and a larger area is being planted this year. This experiment will be watched with great interest. The numerous attempts which have been made from time to time in this Presidency to manufacture refined sugar direct from the cane have always been unsuccessful as it is impossible to secure a reliable supply of cane from the ryots. Under Mr. Neilson's capable management and with the improved canes now available, there is every prospect of success. The area under Mauritius canes in South Arcot has increased since last year from 60 to 247 acres, while there are only 130 acres under the old local cane.

The same canes are also doing well in Ganjám, Tinnevelly and Malabar. In Malabar, where the crop is quite new, the people do not know how to obtain sugar from the cane. Jaggery-making was therefore demonstrated on the Taliparamba farm.

For the first time a small distribution has been made of the Barbados 208 cane introduced by the Government Botanist on the Samalkota Agricultural Station. This is a short sturdy plant yielding juice of exceptional richness. The ryots in the neighbourhood of the Samalkota farm are extremely anxious to have this variety, both because of the fine quality of its jaggery, and because it will require fewer bamboos to support it. The tall canes grown at present require supporting with strong bamboos, and this adds greatly to the cost of cultivation.

17. In spite of a succession of bad seasons the area under cane is increasing both in Gódávari and South Arcot, and this must be ascribed mainly to the greater profit derived from the Mauritius canes. It is specially gratifying to read in Mr. Wood's report that there is no fungus disease in the vicinity of the Samalkota farm.

18. *Sugar-cane experiments.*—The attempt to shorten the period of rotation and to grow cane at more frequent intervals has failed and will be given up, as also the "dry" rotation. In the upland nursery the canes have remained free from disease. A larger area has been taken up there this year with the idea of using only canes from this nursery for planting on the farm. No results can be deduced from the manurial experiments this year, on account of the damage caused by the severe storm at the end of September when many canes were damaged and had to be removed. Irrigation experiments will be undertaken in the current year. The most interesting work on the Samalkota farm this year has been the testing of new varieties. This has shown that several new importations, especially B. 1529, are very high class canes. The experiments in planting methods have proved that planting in rows with only 10,000 sets per acre is better than scattering them broadcast and using 25,000 sets or more per acre. It is gratifying to note that there are signs that the ryots are realizing this.

19. *Ground-nut.*—The ground-nut has taken a firm hold of the Palghat part of Malabar and it will spread rapidly from there. The attempt to introduce it into South Canara promises to be successful, if the people can be induced to sow it with the pre-monsoon showers. A grant of Rs. 500 was made by Government to assist its introduction, and help and advice was given by the Manager of the Taliparamba farm. The Director and Deputy Director visited some of the experimental plots in October. In most cases the crops had grown extremely well. The credit of the idea of introducing ground-nut into the district is due to Mr. Aziz-ud-din, the Collector. Ground-nut was introduced on the Taliparamba farm this year and attracted much attention. Further experiments are being made with a view of introducing it as a rotation crop on modan lands.

It has been proved that when ground-nut is grown after a bare fallow the yield is not so good as when a cereal crop has preceded it. Different crops are therefore being tested to see which has the best effect on the succeeding ground-nut crop.

Experiments show that the South Arcot methods of growing the ground-nut are hard to improve upon, and in districts where the crop is new some of these methods might be introduced with advantage. It is an interesting fact that when ground-nut is grown mixed with a cereal the percentage of kernel to shell and of oil in the kernel is higher than when it is grown by itself. None of the recently imported varieties have proved as good as the Mauritius nut now universally grown.

20. *Pepper.*—As stated is paragraph 20 of last year's report, no results can be expected for some years from the pepper experiments. The yield of pepper from the Taliparamba farm is steadily increasing, and this shows that ordinary care and attention to planting and cultivation is by itself capable of effecting a great improvement in the yield.

21. *Cotton—Seed distribution.*—In the Ceded Districts, where there is a much greater mixture of varieties than in Tinnevelly, seed distribution on a large scale has not yet been possible. The subject is receiving most careful attention. Samples of the two varieties of white seeded cotton, viz., Gadag and white "Northerns," were sent to the Buckingham Mills and through the kindness of Messrs. Binny & Co., an expert opinion was obtained. Both varieties were well reported on and will produce yarn of 20s, with a strength of 80 lbs. The present mixture known to the trade as "Northerns" includes Yerrapatti (brown lint), and Nallapatti (black-seeded white lint),

Both of these are less prolific and their lint is inferior. It is, therefore, clear that the industry could be much benefited by the distribution of pure white-seeded "Northerns" and a start has been made by taking up 45 acres of land for growing seed of this variety. As the resources of the department develop, it is intended to expand this line of work with a view to raising the general type of cotton produced in this tract and maintaining it on a higher level. Experience in Tinnevelly shows that the difficulties attending this can be overcome. In Bellary the Deputy Director is not yet satisfied that the farm seed represents a really superior strain, and seed distribution here on a large scale must, therefore, await the result of the efforts referred to below for producing such a strain by selection and breeding. Small quantities of the farm seed are sold every year without difficulty, but this is valued only because the ryots know that the seed is fresh and good, and not because it is of a better type.

In Tinnevelly the problem is much simpler both because the ryots are more intelligent cultivators and because there are only two types of indigenous cotton, Uppam and Karunganni. The report of the British Cotton Growing Association, confirmed by spinning tests kindly undertaken by Messrs. Harvey & Co. of Tuticorin and Messrs. Binny & Co. of the Buckingham Mills, has established the fact that Karunganni is superior to Uppam. In its natural habitat, the southern portion of the Tinnevelly District, it appears to be at least as prolific as Uppam. Seed distribution has therefore been taken up on a large scale. Seed for about 8,000 acres was sold last year. Much more could have been sold if available, and to provide for next season's requirements seed was grown for the department on 263 acres of ryots' land in the year under report. Pure Karunganni seed of the improved farm strain was supplied to the growers, only well-farmed land was taken, and thorough preliminary tillage and manuring was insisted on. Help was given by the department in drilling and after-cultivation. The crops sown with Government seed last year were decidedly better than the surrounding crops. Most of the owners of those crops are therefore preserving their own seed. One acre of good cotton will produce seed for 25 acres. The effect of the large annual distribution of seed by the department will, therefore, be cumulative, and should raise the proportion of Karunganni in the Tinnevelly cotton as it comes into the market and hence give it an enhanced value. The success of the seed-farms is mainly due to the untiring efforts of M.R.Ry. J. Chelvaranga Raju, who has displayed great tact in dealing with the ryots.

In the Ceded districts where the use of the seed-drill is universal, the only improvement in cultivation which seems feasible at present is the introduction of the heavy iron plough already extensively used in parts of Bellary. It has been brought to the notice of the cultivators in the Nandyal valley, and seven orders have been received for ploughs. Considering the extreme backwardness and conservatism of the Kurnool ryots, this result is satisfactory. As it becomes more widely known its use is certain to spread.

22. *Cultivation.*—In Tinnevelly as forecasted in paragraph 24 of last year's report, about 1,000 acres of privately owned land were sown with the drill, an entirely new introduction into this part of the Presidency. Mr. Sampson and I inspected the largest drill-sown areas in January. In a dry year like last the drill sown crops showed a great superiority over the broad-casted crops, owing to the seed being sown at a uniform depth, and the soil moisture being conserved by frequent after-cultivation. Sowing can, moreover, be done more quickly (an important point where the sowing season is usually short), and can be carried on for a longer time after the rains stop. An article contributed to the April number of the *Agricultural Journal of India* by Mr. Sampson describes the work done. There can be no doubt that the ryots are fully satisfied as to the advantage of drilling their cotton and the small number of trained instructors available is the only obstacle to the rapid spread of the system. Arrangements are being made to hold classes in the villages in the hot weather, since many of the best cultivators have expressed their wish to learn the use of the drill, though they intimate that it would reflect on their professional skill if they were seen going to the Government farm to take lessons in their hereditary art of agriculture. Great credit is due to Mr. Sampson for his successful management of this useful piece of work, and also to M.R.Ry. J. Chelvaranga Raju, and the manager of the Koilpatti Agricultural Station M.R.Ry. A. V. Tirumuruganatham Pillai.

Irrigation of cotton.—The experiments in irrigating cotton at Hagari show that in a dry season irrigation increases the yield of country cotton, but not enough to cover the cost of laying out the land for irrigation and the payment of water-rate. In ordinary seasons it would not be any advantage.

The ryots whose land is commanded by the Kurnool Canal are said to never use the water for cotton.

Attempts to grow superior varieties of cotton with the help of irrigation have all failed.

23. *Cotton improvement.*—The steps which are being taken to obtain an improved strain of cotton are detailed in the scientific reports on the Bellary and Koilpatti stations. Briefly, the idea of importing superior varieties from other Provinces or other parts of the Presidency has been given up in favour of the attempt to improve the local varieties by selection. By "improved" cotton is meant a prolific plant the produce of which yields a higher percentage of lint to seed without any loss of quality. The ordinary Madras cottons give only about 25 per cent. of lint to seed. Both the Deputy Directors are devoting much personal attention to the selection of plants yielding a good percentage. Many good plants have been found, and continuous selection from the progeny of these cannot fail to evolve a plant superior to the existing types. The Government Botanist has begun similar work at Coimbatore on Mendelian lines. While the primary object of the department is to render cotton cultivation more profitable to the ryot, it is felt that attention should also be paid to the demand of the local weaving mills for a stronger and longer-stapled cotton to make India self-supporting. The study of the Bourbon cotton of Coimbatore, the only long-stapled cotton in the Presidency, is being taken up this year to see what can be made of it. At present it comes into the market mixed with an inferior short-stapled cotton, and thus loses its value.

24. *Premia for growing pure cotton.*—In accordance with G.O., No. 2826 Rev., dated 19th November 1907, a premium of two annas per acre was offered to ryots in the Ramallakota-Nandikotkur, Nandyal, Pattikonda, Koilkuntla and Sirvel taluks whose crops have less than 5 per cent. admixture of Yerrapatti and black-seeded cotton. The Collector has recommended the payment of the premium in respect of 159·39 acres. I am of opinion that the offer of the premium is ineffectual and may be withdrawn for the coming year.

25. *Paddy.*—The lines of work referred to in paragraphs 27—30 of last year's report are being pursued. The spacing experiments which are being conducted on all the farms where there is wet land show that time will be needed in all cases before the paddy plant develops or recovers its full power of tillering. The careful analysis of the spacing experiments at Samalkota given in Mr. Wood's Scientific Report shows that the tillering power of the plant increases with the space allotted to it on the ground. The problem, which varies with every variety of soil and species of paddy, is how to fully occupy the land while allowing sufficient space to the plant to attain its full development. At Samalkota the singly-planted plots gave the best yields. At Palur the plots planted in rows showed a large increase over the local method. Mainly owing to the seed being selected from singly-planted fields, there has been a striking increase in the paddy crops at Palur and Taliparamba. It seems, therefore, clear that one of the chief advantages of this system is the rapid improvement which it effects in the quality of the grain. Both at Palur and Taliparamba the neighbouring cultivators were struck with this and were anxious to obtain the seed of singly-planted crops. Comparing the seed rates adopted in the Gódávari and Kistna deltas, where the cultivation of paddy is on a high level, with the rates common in the southern districts, it is clear that an immense waste of seed takes place in the latter districts. It is, therefore, satisfactory that both in Tanjore and Tinnevelly the single planting of paddy is making good progress, among the cultivators. A lecturing tour was carried out this year by Mr. A. Rama Rao, Superintendent of the Sivagiri Farm, with a view to impressing on the Tinnevelly ryots the importance of this and other improvements in paddy cultivation. It is reported to have excited much interest among the cultivators.

26. *Manuring of paddy—Green-manuring.*—In many places the best cultivators grow leguminous crops on the paddy fields in the dry weather. Generally they allow the grain to ripen and harvest the crop, but in some places they plough in the whole

crop. On all the farms experiments are being conducted with different leguminous plants to see if this excellent system is capable of extension or improvement. Two striking failures must be recorded this year. At Hagari on black cotton soil excellent green crops of cowpea, sunn-hemp and horse-gram were raised and ploughed in, but the resulting crop was a total failure. Horse-gram similarly failed at the central farm, where the land is a heavy clay. The success obtained at Sivagiri with *Tephrosia purpurea* (Kolinji) as a green manure was described by Mr. Lonsdale in an article in the April number of the *Agricultural Journal of India*. Usually this plant is collected on waste lands and carried to the wet lands. In the Karúr valley it is said that the cost reaches as much as Rs. 10 per cart-load owing to the distance from which it is brought. The need for a cheaper source of the green manure which is everywhere used for paddy is therefore urgent, and these experiments will be continued on all the farms.

27. *Artificial manures.*—The Agricultural Chemist has investigated the Kistna system of applying old village-site earth, or páti mannu, to the paddyfields. Last season experiments made with various artificial substitutes for this fertilizer, the supply of which is running short, gave encouraging results. These experiments are being continued this year. They seem to indicate that under the Kistna system of cultivation potash is the chief requirement of the paddy crop.

28. The monthly sowings of paddy at Hagari have conclusively shown that the ryots are correct in their belief that paddy crops sown from September-December inclusive will not succeed. Mr. Wood explains that an actual waste of water would occur if the fields were sown earlier, as crops sown in those months have a prolonged period of growth.

It is the general belief of the Gódávari cultivators that the second paddy crop cannot be sown before the middle or end of January. As the first crop is cut in the middle of November, a great amount of water is wasted in the two months which intervene. This question may have an important bearing on the Kistna Reservoir Project, and experiments are being undertaken at Samalkota to find if any variety of second-crop paddy can be sown successfully in November or December.

The paddy experiments at Hagari in irrigating black-cotton soil have conclusively shown that under the local conditions wet cultivation cannot succeed. The "no-manure" plot has never yielded any grain at all. Paddy on such lands needs heavy manuring, while sorghum will yield good crops year after year without manure. A detailed discussion of the experiments will be found in Mr. Wood's Scientific Report on the Hagari farm.

29. *Irrigation experiments.*—Satisfactory arrangements have been made at Samalkota to conduct experiments in the current season as to the amount of water required to raise a full crop of paddy. No accurate experiments appear to have ever been made before on this important point.

30. *Fibres.*—The Samalkota experiments with Bengal jute this year showed that the hopes which were at one time entertained that jute could be successfully introduced into the Gódávari delta must be given up. Cultivation is difficult and costly, and the fibre itself is pronounced by the local mills inferior to the Bimlipatam jute already grown so extensively in the Circars.

It has also failed in Tanjore and Malabar. With the present high price of paddy there is no prospect of Bengal jute taking its place.

Another reason is that cultivators accustomed to growing paddy only have generally not sufficient skill to grow a crop like jute, for which the land needs careful preparation to secure the requisite tilth.

The Hindupur agave plantation was extended during the year. Trial cuttings show an annual yield of 430 lbs. of dry fibre per acre. Next year it is hoped to summarize the results and obtain some conclusions as to the possibility of establishing it as an industry.

31. *Ridge and furrow irrigation.*—At Koilpatti the monsoon ragi crop gave an increased yield of 140 lbs. of grain per acre, cost Rs. 7-1-4 less per acre to grow, and used 11,580 cubic feet less water. In the hot season, when the saving of water

is a more important consideration, the local system of flat beds gave the best result. Further trials will be made to investigate the reason for this.

32. *Irrigation of dry crops under the Ponnalur tank.*—The tank has been inspected three times by the Deputy Director, Northern Division, and twice by myself in the year under report. On my first visit I marked out a portion of the ayacut in the Ponnalur village amounting to 108 acres which was evidently unsuited for the cultivation of irrigated dry crops. Permission was accordingly granted in B.P., No. 4466, Mis., dated 15th October 1908, to grow wet crops on this area.

At the same time I took a number of samples of the soil and sub-soil in this village. The Agricultural Chemist reported that the analysis confirmed the contention of the ryots that the land was liable to suffer from the accumulation of salts on the surface if irrigated dry crops were cultivated. A full report will be submitted shortly when the Collector replies to a reference I have made to him in the matter.

33. *Experiments with the reclamation of saline land in the Periyar tract.*—The Deputy Director, Southern Division, and the Agricultural Chemist visited the Therkutheru experimental plots in May 1908 in company with the Assistant Engineer. Their report showed that such local experiments could not lead to any useful result, and that the first requisite was to ascertain the nature and extent of the saline areas, and their position with reference to the possible lines of drainage. The Executive Engineer was asked if he could undertake this survey and his reply is still awaited.

34. *Bulletins.*—Occasional short notes on agricultural subjects are communicated to the Vernacular Press, but it is found that the actual cultivators are seldom reached by this means.

The Agricultural Calendar was brought out this year in a new and enlarged form, and issued in English, Tamil and Telugu. One copy was distributed to the head-master of every school in the Presidency and many others to officials and members of Agricultural Associations. The notes were intended to convey simple information on well-tested improvements recommended by the department, and on the work of the department, and the nature of the help which it is in a position to give to private individuals. Excellent designs for the covers were prepared by Mr. R. C. Wood. In all about 42,000 copies have been distributed, a fair number being sold at Agricultural fairs, railway stations, festivals, and in the vicinity of the different Government farms. Mr. Sampson reports that since the issue of the calendar he has been receiving many more requests from private individuals for information on the agricultural topics dealt with in the calendar. It is, therefore, hoped that it has to some extent fulfilled its purpose and attracted some attention to the existence and work of the department. It will be issued again in the current year.

C.—Agricultural Associations, Shows, etc.

35. Agricultural exhibitions and cattle shows were held at Arni by the Jaghirdar, at Koilpatti by the Zamindar of Etiapuram, at Ongole, Tirupur, Kizhur, Pudukkóttai, Berhampur, Madura, Pithapuram, Parvatipuram, and Ellore by the Agricultural Associations concerned, and at Trichur by the Cochin State. On the West Coast the Malabar and South Canara Associations are encouraging the planting of ground-nut with fair prospects of success. The Kumbakónam Association still displays the most activity. It has a farm of 8 acres and publishes a monthly journal on agricultural matters. It has drawn a good deal of attention to the single-seedling system of transplanting paddy which is reported to be gaining in favour there. Its experiments with sugarcane, ground-nuts and green-manuring for paddy should have a good effect. The Madura and Coimbatore Associations have hit on a really useful line of work in purchasing sets of boring implements and employing trained maistries to conduct boring operations. The operations in Madura have been successful. In many cases the supply of water to existing wells could be improved by this means. In Tinnevelly several members of the Association have adopted the single-planting system of growing paddy with good results. I saw some good crops of Mauritius sugarcane near Tinnevelly introduced by the Association. It is fortunate in having some

wealthy and intelligent members with a practical knowledge of agriculture. The Mauritius sugarcanes introduced into Ganjám last year by the Association are doing well and will be a great acquisition to the district.

Most of the other Associations are in a dormant condition. They are recommended to seek the advice of the department more freely in regard to the lines of work suitable for them.

IV.—BOTANY.

36. The report of the Government Botanist is printed as an appendix. Since his return from leave much of his time has been occupied in preparing lectures and teaching. The Botanic Garden at Coimbatore has been laid out, a new well dug for it and experiments with cotton on Mendelian lines have been commenced.

V.—CHEMISTRY.

37. The Agricultural Chemist occupied his new laboratories in March last. During the year under report much time was devoted to the preparation of lectures and teaching. It will require several years' experience before a course of instruction suitable to the requirements and capabilities of the students can be devised. Mr. Harrison is sparing no pains to arrange a satisfactory course.

Under the head of analysis the work on the pâti mannu of the Kistna district referred to above has opened up a useful line of work. The supply is falling short and the Agricultural Chemist is trying to devise a substitute. Thirty-one analyses were made of saline soils from the Periyár tract and the ayakat of the Ponnalur tank. The analytical work of the department already occupies the whole time of two assistants and all the most difficult work is done by the Agricultural Chemist himself.

38. Till the new laboratory was available little could be done under the head of Research. No suitable applicant has yet been found for the post of assistant in this branch, and Mr. Harrison has therefore to work single-handed. It is hoped that, in spite of the pressure of the other branches of work, time will be found for pursuing the lines of work detailed in the Agricultural Chemist's report. All of them are of far-reaching importance for this Presidency.

VI.—AGRICULTURAL EDUCATION.

39. In framing the rules for the admission of students to the Agricultural College a radical change was made from the policy followed at Saidapet. No scholarships were given, and no specific promise of employment in Government service was held out. It was, therefore, gratifying that 87 applications for admission were received. Only 20 students were admitted, and the guiding principle followed in making the selection was that students likely to be connected with the land as owners or, preferably, as actual cultivators were preferred, provided that their knowledge of English was sufficient to enable them to follow the lectures. The students worked fairly well, till the outbreak of plague in the town, accompanied by the usual alarmist reports, caused several of the students to be withdrawn by their parents. At first some difficulty was experienced in getting them to treat the practical work seriously. In view of the importance of the matter a general conference of all the officers of the department was held, and arrangements were made which should ensure better results. The subject will continue to receive the most careful attention. It is felt that much of the money spent on agricultural education in the past was wasted, as the students turned out did not possess enough practical knowledge of ordinary agricultural operations to command the confidence of the cultivators in any recommendations they might make. Marks are allotted to each day's field work, and the Deputy Directors have been asked to visit the College at least once a term and report on the results of the practical training of the students in the light of their experience of work on the different Agricultural Stations and among the cultivators in the districts.

In the teaching of Botany, Chemistry and Physics, special endeavours are made to give prominence to the relations which Science has to every-day agriculture and not to attempt too much. Further experience will be needed before the exact amount of pure Science, which can be profitably given to, and assimilated, by the students, is determined.

The students are being associated with all the experimental work conducted by the Agricultural Chemist and Government Botanist on the farms and the Botanical Garden, so that they may appreciate the bearings of Research on Practical Agriculture.

40. *Publications.*—The number of publications received from and sent to other countries and other Provincial departments was as follows:—

	Indian.	Foreign.
Journals	22	64
Bulletins	37	258
Reports	249	72

Two bulletins were issued during the year, viz., No. 58 on the cultivation of ground-nuts by Mr. Sampson, and No. 59 on Sunn-hemp by the late Rao Bahadur C. K. Subba Rao.

Tamil and Telugu translations of Bulletin No. 57 (on fig cultivation) were published, and a Telugu translation of No. 58 (on the cultivation of ground-nuts).

The Agricultural Calendar has been referred to above.

Several articles on agricultural subjects were contributed by the officers of the department to the Agricultural Journal of India during the year.

CAMP, TALIPARAMBA,
5th July 1909.

M. E. COUCHMAN,
Director of Agriculture.

APPENDIX I.

ADMINISTRATIVE REPORTS OF THE AGRICULTURAL STATIONS DURING THE YEAR 1908-1909.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, NORTHERN DIVISION.

The headquarters of the Northern Division continued to be at Bellary during the year. Apart from the farms, district work during the year was mostly confined to the Northern Circars, where, with the present limited staff it is easier to take up problems which it is considered will lead to definite results. It is difficult to make progress in the Ceded districts with the extensive system of agriculture there adopted, with an uncertain rainfall, and with a people, who, though skilful in their own way, are indolent and conservative.

The Deputy Director was on duty the whole year, with the exception of six days' casual leave. Two hundred and forty-seven days were spent in camp involving journeys of over 8,000 miles by rail and 742 by road. All the Agricultural Stations in the Northern division were visited during the year — Hagari five times, Nandyal five times, Bezwada six times, Samalkota nine times, and Hindupur twice.

2. *Staff.*—The post of Sub-Assistant Director of Agriculture has been vacant throughout the year. The clerical staff have worked short-handed for most of the time. The executive staff has been increased during the year by the posting of a Farm Manager to take charge of the newly opened Agricultural Station at Bezwada, a Farm Manager for itinerant duty, an Assistant Farm Manager to the Samalkota station to look after the irrigation experiments to be conducted there, and an Assistant Farm Manager to be attached to the Deputy Director's office: the last has been employed up to the present in district work. The Manager at Samalkota has been changed; the Managers at Nandyal and Hagari have remained in charge of their respective stations throughout the year. The Assistant Farm Manager in charge of Bellary was away for three months on privilege leave. One Assistant Farm Manager has left the department for service under the Court of Wards, and another has just recently been appointed to the Forest Department. No public building is yet available for the location of the head office; the clerks work in the Assistant Manager's quarters at the Bellary station, and the records are kept in the seed store.

3. The year marks an extension of district work. The Deputy Director toured in the Gódávari district in June; in Ganjám in July and August; in Guntúr and Kistna in September and October; in Kurnool in January and February; and in the Kistna delta in March. The Gódávari tour was to see the extent to which the practice of green manuring is carried out and to consider the possibilities of its extension. As a result further investigation on this important subject will be taken up at the Samalkota station. The result of the Ganjám tour was the recommendation to the Agricultural Association to increase the area cultivated with ground-nut, and to grow it more carefully; to grow green manuring crops before their monsoon paddy crops, and to practise thinner and more economical transplanting of paddy seedlings. The introduction of Mauritius canes into this district has been markedly successful, and they may be expected to spread rapidly in the near future: there was a fair competition for the sugarcane prizes at the Association's exhibition in January, and two or three of the gardens visited by the Deputy Director were excellent. A Farm Manager was deputed to assist the growers in adopting the Samalkota methods of cultivation. The Kurnool tour was to investigate the cottons of that tract: incidentally the introduction of sunnhemp on the wet lands under the canal in the vicinity of Kurnool, has been taken up, and seed supplied to several ryots with instructions as to its use: three visits have been paid by an Assistant Farm Manager to assist them and to report on the progress of the experiment. During the present hot weather, the demonstration of the big cotton soil plough is being carried out by the same Assistant Farm Manager in the Nandyal valley. It is exciting a certain amount of interest, and orders for six ploughs have already been received; an arrangement has been made with Messrs. Massey & Co. whereby some ploughs and spares are to be kept at the Nandyal station for sale.

4. In co-operation with the Agricultural Chemist an important line of work was during the year taken up in the Kistna district, with a view to the discovery and distribution of a cheap artificial substitute for the village earth (*pati mannu*) which is practically the only manure applied to wet lands in the delta, and the supply of which is rapidly becoming exhausted. Three Farm Managers were altogether employed in the distribution of the manures proposed, and in subsequently inspecting and reporting on the crops. This line of work is to be extended during the coming year.

5. The cultivation under the Ponnalur tank was inspected by the Deputy Director three times during the year, and a report submitted. A visit was also paid in company with the Director of Agriculture to Mr. Barry's lankas in the Gódávari district. The Deputy Director attended the Berhampore, Ellore and Ongole shows.

6. An improvement may be noted in the relations of the farm staffs with the surrounding districts; the number of visitors to the farms has increased: more touring, especially on foot in the neighbourhood of the farm has been done, and more interest is being shown by the ryots in the work going on. The number of applications for seeds, implements or advice has increased; 68 separate applications for seed and 4 for implements were complied with in nearly every case.

The Bellary Agricultural Station.

7. The season was up to a certain extent favourable, though it closed with a very trying period of drought which seriously affected the yield of jonna. Cotton, when sown with korra, was, where the latter grew well, a complete failure. The korra crop was the noticeable feature of the farm with an average yield of about 600 lbs. per acre; this must be regarded as a bumper crop, and is undoubtedly due to the more intensive cultivation which the farm lands receive, coupled with the compulsory fallow most of them had last year; the money value of this yield is over sixteen rupees per acre. An excellent crop of early sorghum (*mungari jonna*) was obtained off the new field [No. 8] which was cultivated for the first time. Late crop sorghum (hingari jonna) was only moderate. The experimental plots were all maintained, and have been fully discussed in the Scientific Report. Attention may here be called to the progress of the plantwar selection of cotton, which was first started at this farm, and which is now in its third year: the results are encouraging, and several healthy and prolific plants with over 33 per cent. lint have been raised. Further selection has been made this year.

8. The small stock of farm cotton seed found a ready sale at a price about 20 per cent. above the market rate. Of the total of 5,334 lb., 792 lb. was reserved for sowing this and the Hagari farm, while the rest was sold in lots of one rupee's worth at a shop in the bazaar rented for the purpose. Full enquiry has been made into the behaviour of the seed in the villages where it was grown, and the opinion in which it was held by the ryots, but it seems clear that though it is appreciated for its vitality and cleanness, yet apart from the fact that the plants are of one type, the strain does not seem intrinsically superior to the ordinary country cotton. None will therefore be repurchased from the growers, though the stock of seed raised this year will be sold in the ordinary way. While touring in connexion with this question, the Assistant Farm Manager has taken the opportunity to bring the work of the Farm to the notice of a much larger number of ryots than formerly, by getting them seed, selling calendars, lending farm implements, and otherwise helping and advising them. A number of indents for Ceded district implements and tools were complied with. Just now several ploughs are being obtained for the Nandyal valley where an Assistant Farm Manager is demonstrating their use. A man was sent from Bellary to superintend the erection of a mhote and ramp according to the local pattern at Coimbatore. The slope of the ramp of the well on the farm was also, on the suggestion of the Director of Agriculture made steeper, to make it correspond to slopes observed on ramps in the neighbourhood.

9. During the year the number of permanent coolies was reduced from five to three. Three bullocks were also sold. The Assistant Farm Manager, who is assisted by one clerk on the farm, prepared two notes, on onion cultivation, and the methods of extracting oil from safflower.

The Hagari Agricultural Station.

10. Investigations continued during the year to ascertain the feasibility of wet cultivation on the black cotton soils of Bellary have given fairly clear results. The experiments show that by growing a surface rooting plant such as paddy under swamp ('wet') conditions, the inherent fertility of the soil, which can produce very fair 'dry' crops year after year without manure being supplied, is neglected, and that practically all the food needed by the paddy crop must be supplied in the form of manure. This is unsound practice, as it should be the aim of every farmer to make the most of the natural fertility of the soil he cultivates.

11. A fairly definite reply based on the results of the seasonal paddy plots (*i.e.*, plots planted every month throughout the year), may be given to the contention that the ryot of the Ceded districts wastes the water which often fills the tanks in September or October, by delaying his wet cultivation till January. The experiments show that by sowing before January, the period of growth of the plant is prolonged, at risk of injury by insect or fungus attack, the yield is diminished, and that the water instead of being stored in the tank exposed only to evaporation, is wasted owing to the longer period it is needed in the field, where it suffers loss from evaporation, absorption, and percolation. Local practice is in this instance fully justified.

12. The experiments dealing with the irrigation of cotton are not yet fully complete. They bear out the results noted last year that *in a dry season*, such as the present, a single irrigation will increase the outturn of kappas by 100 lb. worth Rs. 8. A second irrigation has this season resulted in a further increase of 80 lbs. of Kappas. This increase would be very much less evident in a good season. Attempts to grow a superior variety of cotton which under irrigation, would prove more profitable than the country cotton have not been successful. Egyptian cotton and Dharwar American were sown in the basins but both were poor. An attempt to lengthen the growing period of the country cotton by sowing it early, with the help of irrigation, failed completely. The effect of thinning the cotton crop was again tried: this

year in connection with the irrigation of this crop. Generally speaking, in a year of drought, the closer the cotton plants are left, the better is the crop, but if water is given, the thinned plants are enabled to take advantage of the extra room, and give then as good a return as the unthinned plants.

13. As at Bellary, the korra crop was excellent, and similarly the cotton crop was correspondingly poor. The main jonna crop was only moderate. Plantwar selection of cotton was commenced last year and the first crop of selected plants was grown during the present season. The engines worked satisfactorily during the year. The new engine installed at the secondary pumping station has been used for running a chaff-cutter, winnower and a cotton ginning machine as well as for lifting water for the needs of the paddy crop in Field No. 2. The chaff-cutter was particularly useful in making the most of the scanty supply of fodder: the amount of wastage if the straw is chaffed, being much reduced. The general aspect of the farm has improved. The many trees planted during the past two years are doing well except on the dunes, where the sandy soil and the short rainfall received for the period militate against their progress. The farm was visited in increased numbers and friendly relations were cultivated with the neighbouring farmers.

14. The Farm Manager, M. Mangesha Rao, who has been in charge during the year, toured through the villages on the river bank above and below the station, to ascertain the present extent to which garden cultivation is practised, and the possibility of its increase. Largely as a result of his report, a demonstration garden is to be laid out on the mixed soils in Field No. 12. He was awarded the special prize offered by the Director of Agriculture to officers of the Department for the best essay on "The needs of the cultivators in the vicinity of the farm."

The Nandyal Agricultural Station.

15. Investigations on the cotton crop of the Nandyal valley have been pursued during the year both by observation in the district and experimental work on the farm. The theory has been formed that this district has been the scene of a succession of introductions of cotton which, at first superior, have gradually degenerated in the existing environment to the level of the country "Northerns" cotton. By selection on the farm, the standard is being rapidly raised, with the result that the differences between the Gadag—a comparatively recent introduction from the Southern Mahratta country, and the indigenous Northerns, are being obliterated, owing to the more rapid improvement under this treatment of the more degenerate indigenous cotton. The result of spinning trials last year showed only slight differences between the cottons as grown on the farm while the yields obtained at the farm have shown a decided superiority each year in favour of the local cotton. Observations made during a tour in the principal cotton growing villages of the Nandyal valley, confirmed the opinion formed as to the mixture of types which forms the trade "Northerns". The method of distributing seed under agreements has not proved a success: first sowings in many cases proved failures and the remainder of the seed was mixed with local cotton for the second sowing. It has been decided to rent land outright for seed growing purposes during the coming year.

16. The process of selection referred to above is proceeding with encouraging results, and in the course of a few years a strain of cotton superior from both the buyers' and growers' point of view ought to be available.

17. The experiments conducted this year on this crop comprised a comparative test of four varieties, a cultivation experiment to gauge the value of the local practice of growing horsegram along with cotton, and another to see how far extra care in cultivation in the shape of topping and thinning would prove profitable. A spacing test was also laid out. The experiments were for the most part unsuccessful owing to the bad germination of the cotton, and the plots were in many cases full of blanks; undue importance must not therefore be attached to the results. In the variety plots, Northerns were superior to Gadag in point of yield: ginning determinations have not yet been made: the biggest actual yield was obtained from Yerrapathi: the biggest yield per plant was given by a cotton known as D', one of the types picked by the Government Botanist from a plot of local cotton at Bellary in 1903. Its real value cannot be estimated until the quality and value of the lint have been ascertained.

18. The early sown sorghum (mungari jonna) was devastated by a severe attack of stem-borer which necessitated the destruction of the entire crop. While the severity of the attack was due to the unhealthy nature of the plants induced by the incessant rains in July and August, the sudden appearance of the pest in overwhelming numbers is a problem not easy to explain. The same four varieties sown in the late (hingari) season showed the superiority of the local variety, cheruku patcha jonna. It is unfortunate that in ordinary seasons the farm land is unsuitable for growing early sorghums. Two more varieties were introduced during the year, on a small scale; seed has been obtained for comparative trial next year. The rotation plot is being continued: the plots sown in previous years with indigo were this year cropped with jonna: cotton was grown on the two which carried jonna last year. District work has increased: the demonstration of the cotton soil plough conducted by Assistant Farm Manager Raghavachariar, the distribution of small quantities of seeds and manures, the sale of agricultural leaflets, visits paid by the staff to neighbouring villages have all tended to make

the farm better known in the district. Though the people are generally inclined to be apathetic, offers of assistance have been received from one or two landlords and readily accepted.

The farm has been in charge of Farm Manager S. Ragunatha Rao throughout the year, assisted by a clerk.

The Bezwada Agricultural Station.

19. As this farm was taken over from its previous occupiers, the District Board, Kistna, only in May last, there is very little to report in the way of experimental or scientific work. Fortunately the monsoon broke late as, owing to various difficulties experienced in obtaining funds, and taking over the stock, it was not until July that the first sowings could be made.

20. The farm is situated in the Bezwada Municipal area, and occupies a piece of land lying between the Ellore and Ryves' canals; on either side, the large spoil banks covered with rough bushes form the grazing ground for the cattle and goats kept by the townsfolk, against the depredations of which the wire fence round the farm is but a poor protection. Yet another difficulty is felt in obtaining labour, owing to the steady demand at high wages for both male and female coolies in the numerous workshops, mills and factories of this busy town.

21. The soil is fertile, a black deep alluvial clay loam which like regada soil, cracks extensively in the hot weather. It has been allowed to become infested with grass (*Cynodon dactylon* and *Cyperus*) and is in an exceedingly foul state; not a matter for surprise, when one learns that much of the farm revenue used to be derived from the sale of grass to horsekeepers in the town. A good deal of sand has been carted, presumably to make roads: it has never been spread and now lies in unsightly heaps about the farm.

22. The season, though it started late was fairly favourable for the early sown crops, but there was not sufficient rain to bring the late sown crops to maturity. The climate of this locality bears an unfavourable reputation, and is characterised by excessive heat. The average rainfall is about 34 inches received from April to December. The season is thus a peculiarly long one, and unlike most localities in South India, there are three recognized periods of cultivation known locally as the *punasa* season (crops sown April to June) the *panta* or *parvam* season (sown June to September) and the *paira* season (sown October to December). Good early rains are as a rule needed for the first named: the *punasa* crops this year were sown late, but with the help of timely and well distributed rainfall in August and September grew well. Rain at the time of flowering practically destroyed the early gingelly crop, though sazza (*Pennisetum typhoideum*) was more fortunate and yielded very well. The rains began to fail later in the season, and September was characterised by a number of days of light rainfall which did no appreciable good. The middle crop jonna (*sorghum*) though it grew well enough at first and gave indeed a good yield of fodder, began later on in its growth to feel the lack of moisture and with the failure of the late (*paira*) rains it was unable to push the flowering spikes freely out of the sheathing leaves and form well filled earheads. Bengal gram (*Cicer arietinum*), a *paira* crop, was a failure.

23. A noticeable feature about the agricultural practice of the district is the cultivation of sorghum as a fodder crop. It is sown thickly in the early season, and yields in this way very heavy crops of thin-stemmed, succulent and nutritious fodder. It is largely to this practice, and to the method of handfeeding with small quantities of green fodder pulled daily from the field, that the excellence of the cattle in this district is due. A yield of more than 5 tons of dry fodder per acre of first class quality, was obtained from No. I.-A. The same crop, sorghum, is also largely grown for seed, and in good seasons very heavy yields are obtained. Varying directly with the amount of grass in the fields, the yield of grain on the farm varied from 612 to 357 lbs. per acre. Including the straw the grass has caused a dead loss of about Rs. 16 per acre, and when one considers that most of this could have been avoided by a single deep cultivation with a big cotton soil plough at an outside cost of Rs. 10 per acre, it will be seen that there is room for the introduction of this implement. Sazza (*Pennisetum typhoideum*) gave a very good yield of nearly 1,000 lbs. of grain per acre. The straw of this crop is considered worthless, and it was used for thatching the quarters on the farm which were in a bad state of repair. Cotton which is a *paira* crop was sown in fields Nos. 11 and 15, Cambodia cotton, and 12 and 16, local cotton. Both have suffered from the drought, and have up to the present yielded only moderately. Picking is not yet complete. The work of seed selection has been carried out on both these crops, as in all those sown on the station.

24. The few experiments designed were nullified by the season and the state of the land. Field No. 6 was sown with jonna, various subsidiary grams singly or in combination being sown in strips in order to compare their yields, their profit and their action in keeping down the grass. The land was left with so little moisture after the harvest of jonna, that there was no yield obtained from any of them. The other experiment was the wider spacing of jonna and maize: jonna grew slowly and was stunted though the heads formed were plump and of a good shape: the total yield was very low. Maize was a complete failure.

25. The station has been in charge of Farm manager, Natesa Iyer, who joined on the 20th June 1908. He has shown himself capable of quickly picking up local practices and opinions, and the reasons which underlie them.

The Samalkota Agricultural Station.

26. It is satisfactory to be able to report that at the time of harvest this year, the cane crop on the farm and in the neighbouring fields was practically free from 'Red Rot'. The canes suffered severely from a storm at the end of September, and it is not clear whether the damage was due directly to the injury to the root system done by the swaying of the heavy canes in the wind, or to the rapid spread of the disease in the weakened canes. In any case the absence of the disease later in the year, a fact about which there is no doubt, presents a problem which is not easy of explanation. Considering the freedom from disease enjoyed by the upland canes in the previous year, it was thought advisable to secure a further area of 'upland', and two and a quarter acres were taken on a year's lease and have now been planted up with all the farm varieties, the greater portion being devoted to the new seedling canes. Meanwhile on the farm all canes that showed symptoms of disease were cut out and milled with the result that most of the experimental plots were spoiled. The plot planted with canes in trenches, which were gradually filled as the cane grew up, kept quite healthy, showed none of the symptoms which appeared after the storm and ripened later than the other canes. The situation at present is this. To the other precautions which cane growers were recommended to adopt in order to check the ravages of the 'Red Rot', namely, good drainage, careful selection and care in cultivation and irrigation, may now be added the adoption of a longer rotation. Experience on the farm has clearly shown that the three-year 'wet' rotation of wet paddy and cane does not allow of sufficient rest to the land between the crops of cane. The failure of the two-year 'dry' rotation has also shown that whatever be the cause, conditions are not sufficiently improved by this method of treating the land to warrant the shortening of the rotation by a single year: in other words canes grown in a two-year 'dry' rotation were worse than those grown in a three-year 'wet' one. Little progress has been made in testing cultural or manurial improvements. The land has been uneven and the plots have invariably suffered from disease and definite proof of the value of the practices introduced has not been obtained.

27. With regard to distribution it was observed last year that the local demand was small. The situation with regard to the five varieties previously distributed remains the same: growers in the delta can obtain them, even if at slightly higher cost, yet more conveniently, from each other. This year the new seedling cane B. 208 has attracted much interest in the neighbourhood and many applications were received for seed. After meeting departmental needs, a few picked growers, who promised to plant the cane in lines, an improvement strongly recommended by farm practice, were given small quantities. Some were also sent north to Anakapalle where the Manager of the Deccan Sugar Company has kindly promised to distribute it to his clients, and some to Kavali, a village in Nellore. It maintained its reputation for richness and purity of juice and with the exception of B. 1753 is the best cane at present on the farm. From its habit and growth,—it is a short bunchy cane producing tillers freely,—its yield should be quite up to the mark. It is hoped that with the precautions now being taken, by the lengthening of the rotation and by the extension of the uplands area, a supply of new and rich varieties may be assured to the cane growers of the district, which will no doubt supplant the Mauritius canes as surely as they have supplanted the older varieties: Mauritius canes, it is stated, now occupy 70 per cent. of the total area under cane in the district. The demand for canes from growers outside the district is increasing as the farm becomes better known: canes were sent to Vizagapatam, Bombay, Baroda, the Punjab and Louisiana, U. S. A.

28. The paddy experiments initiated in the previous year were extended and the theoretical conclusions drawn from them are discussed in the Scientific Report. The possibility of a great economy in seed was indicated but it is recognized that the perfect spacing of seedlings depends on a great number of factors and varies almost from field to field.

The fibre plots were again unsuccessful: Bengal jute proved costly to grow and prepare, and gave only a moderate crop.

29. The scheme for improving the water supply has been carried out and through the courtesy of the Public Works Department the farm has now a privately controlled irrigation supply through a hitherto unused opening in the Rameswaram sluice. The water is conducted along one bank of the present Burreya's channel in a masonry flume from which measured quantities can be let into the fields. Accurate data for calculating the amount of water used on the farm will thus become available.

30. A pair of buffaloes were purchased during the year at the Pithapur market, and have proved extremely useful. The bullocks have worked well throughout the year.

Farm Manager Balakrishnamurthi relieved Farm Manager Muthuswami Aiyar of the charge of the station on the 1st of July and has been in charge since. Assistant Farm Manager N. Sitaramaswami Naidu was on duty throughout.

The Hindupur Station.

31. The year under report has marked an extension of the work at this station. In order to compare various methods of planting sisal agave (*Agave rigida var. Sisalana*), with a view to obtain a quick and regular start, a plot of land near the old plantation was laid out and planted in July. A small piece of rocky land near Somandapalle was also planted out with sisal at the

same time, to ascertain the minimum of attention which could be given to a plantation of this sort, and to compare the growth of the plant on this land with that at Hindupur. Cuttings to determine the yield per acre were continued at Hindupur. The plantation has been in charge of Assistant Farm Manager Raghavalu Naidu.

32. The first experiment was designed to test the effect of trimming off the old roots and the lower leaves of the young plant before putting it in the ground. It was thought that a more rapid formation of new roots would be formed from the clean cut base, and that the plant would thereby become more quickly established. In practice it was found that it is difficult to regulate the cutting by inexperienced coolies, and that in many cases the cut was made too deep, and the central bud damaged, with the consequent death of the plant. The second experiment was to compare planting on ridges with planting on the flat. The experiment from the present appearance of the plot indicates that planting on ridges is the more profitable practice, well repaying the extra expense : it also seems advisable, up to a point, to plant out as large plants as possible.

33. The plantation at Somandapalle is about 2 acres in extent and was planted in July last with about 2,000 suckers. The site of the plantation consists of a small hill of trap which appears as a " dyke " in the surrounding gneiss. It is covered with large rocky boulders with pockets of red gravelly soil in the interstices. The cost of planting was Rs. 26, most of which was paid for carting the suckers from Hindupur, a distance of 25 miles. Though the season has been extremely dry and unfavourable, comparatively few plants have failed to strike, such failures as there are being mostly due to damage by cattle and wild pig.

34. With regard to the yields last year's output is calculated at 430 lb. dry fibre per acre from the trial cuttings made in June and November 1908 and February 1909. This is from plants which had been regularly cut for the year previous, and the figure may be taken as accurately representing the annual yield to be expected from a healthy plantation of sisal agave such as the present, in this district.

35. The experiment cannot be finally reported on until it is seen how long the plants will live without flowering or " poling," as it is called, as this marks the close of their life. About 80 have already flowered and died. The young " bulbils " as they ripen, are being planted out in nurseries, along with the suckers removed from the plantation, and a very large quantity of young plants is now available for sale or distribution.

36. With the exception of the watchman's pay, the cost of extracting and preparing a small quantity of fibre for exhibition, and the expenditure noted above, no other expense has been incurred during the year under report. It will probably be possible next year to write a complete account of the experiment from the start.

BELLARY,
8th May 1909.

R. CECIL WOOD,
Deputy Director of Agriculture, Northern Division.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, SOUTHERN DIVISION.

The Koilpatti Agricultural Station.

The Koilpatti Agricultural station has been under my charge throughout the year under report and the work has been continued and extended on the same lines as last year.

2. *The season.*—This has again been exceptional but not altogether favourable. No rain was recorded for a period of 100 days from the end of May till September and again from November 6th till December 31st. In September three sowing rains fell with the aid of which the red soil crops were sown ; and three sowing rains fell in October and the beginning of November with which the black soil crops were sown. Most of the cotton on the farm was sown only after November 6th and until the close of the official year—a period of five months —only 3·07 inches of rainfall were recorded, 2·29 inches of which fell in the first week of January, which helped the cotton crops considerably. The red soil crops, which were dependent on rain, suffered badly, but where seed was specially required some of them were helped out by irrigation from the wells.

3. *Crops on the black cotton soil—Cotton.*—The permanent manurial experiments under cotton every year were discontinued for the reasons stated in last year's report. The rotation and cultivation experiments were continued and spacing experiments were started with Uppam cotton this year. Similar experiments will next year be started with Karunganni cotton which has a different habit of growth. The work of seed selection is now developing. Last year some 3,000 plants were tentatively selected and this number was reduced to about 300 after the ginning test had shown the percentage of lint to kappas. The seed from each plant was sown separately and the crops are now being harvested. Of the ordinary pure Uppam and Karunganni it is too soon to measure any improvement. Of the Karunganni plants fertilised " *inter se* " a much greater vigour is shown. There are variations but in the main there are four

distinct types of this, and it seems probable that it will be possible to produce varieties of Karunganni which will suit the different climatic conditions of the district. Of the Uppam plants fertilised "*inter se*" besides a slight additional vigour in growth there is little visible difference between them and the ordinary self-fertilised plant. Of the hybrids between Karunganni and Uppam very few plants have been kept as these are either barren or nearly so or are too late in ripening to be of any use in this district. Most of the plants which have formed bolls have been unable to open these properly and they have very large seeds with a very little lint adhering to them. Kappas of some of the rows sown with the seed of individual plants have been collected altogether when it was seen that the habit and lint were uniform and these will be sown on large plots next year with a view to ascertaining the yield and to obtain seed to sow on a field scale the year after. In other rows the kappas of each plant has been collected separately with a view to more rigorous selection now and improvement in the future. Besides the cotton and the usual rotation crops three of the pulses tried last year were this year tried on a field scale mixed with cumbu but they have not succeeded well as the season has been against them. The same was the case with Bombay varieties of cholam which were introduced at the suggestion of the Inspector-General of Agriculture. These grew well until they came to ear when they were attacked by stem-borer and yielded no grain.

4. *Crops on the red soil.*—At first these promised very well but they were unable to stand the continued drought of November and December. The experiments with the planting and irrigation of ragi have been continued and with assistance from the farm this method of cultivation is beginning to be taken up by the ryots. The superiority of the ridge system has again been shown; even in a trying season such as has been experienced 1,737 lbs. of grain grown with 16,117 c. ft. of water at a cost of Rs. 48–3–2 per acre for ridge planting against 1,597 lbs. of grain grown with 27,697 c. ft. of water at a cost of Rs. 55–8–6 for planting in beds in the ordinary way. The use of Neem cake, which is now largely produced and exported from the district, as a manure for irrigated ragi was also demonstrated, giving a net return per acre of Rs. 10–7–8 or an increased yield per acre of 505 lbs. Special attention has this year been paid to onion cultivation. This is a very popular money crop in the neighbourhood on land irrigated by wells and is largely exported from Tuticorin. The system of growing from seed has been introduced from the South Arcot district and the large Bombay onion which may suit the export market was also tried. So far these trials are a success; the local bulbs gave a crop of 5,918 lbs. per acre, South Arcot seedlings, 7,400 lbs. per acre, and Dhulia (Bombay) onions, 11,125 lbs. per acre. Several new varieties of local crops have also been tried notably cow-pea varieties some of which are very promising, cumbu varieties from the Transvaal and varieties of maize.

5. *Work outside the station.*—The work done with the allotment under cotton improvement is intimately connected with that of this agricultural station and a detailed report of the year's operations has already been submitted separately. To cope with this it has meant very severe work for all the staff, both officers and coolies. To the latter it has been specially severe as many of them went down with fever when away at distant villages. It has meant continuous touring for most of the staff which has however given them a deeper insight into the agricultural practices of the cotton tract.

6. *Miscellaneous.*—Visitors, chiefly black cotton soil ryots, now constantly visit this station while many others come for advice and assistance. Twenty-two fresh men and four women were trained in drill cultivation for work under cotton improvement and two men were trained for the Palghat Agricultural Association. Eight hundred and fifty copies of the Agricultural calendar (Tamil) have been sold around the station, chiefly to ryots, which shows a great advance in the confidence of the people. The cattle are all in good condition. One pair were sold being too old for black-soil work and they were replaced by a fresh pair. The revetment of the odais or field drains in the black soil is being steadily pushed on when time permits.

The Palur Agricultural Station.

7. The Palur Agricultural station has been under my charge throughout the year under report.

8. *The season and rainfall.*—The total rainfall has been about the average, viz., 50·95 inches. Half of this however fell within a fortnight at the end of October and beginning of November. The season for irrigated groundnuts (February-June) was not favourable. The weather was very dry and the showers were few and far between. The south-west monsoon season when dry cereals and rainfed groundnuts are sown was on the whole good. Sowing rains fell on June 10th and good rains were recorded on July 11th, August 11th and 20th, September 8th to 11th and October 3rd to 6th. A similar amount of rainfall if it had fallen in light showers would have been disastrous. The north-east monsoon, as already mentioned, opened with a fortnight's rain at the end of October which considerably damaged the dry crops and the newly transplanted paddy. Except for a further 7 inches in the first week of January practically no more rain was recorded. Irrigation difficulties were again experienced. Through want of co-operation among the different villages the channels were never properly cleaned and even that

work which was completed had to be done all over again as the channels again silted up with the heavy rains in October. This again delayed the planting of sugarcane and prevented its proper irrigation afterwards.

9. *Dry land crops.*—The groundnut crops grown under well irrigation in the hot weather were this year a failure and were badly attacked with "verpuchi" and "surul". The rainfed cereal and groundnut crops have however all done well. Only the cereal groundnut-rotation experiments and variety tests were continued this year as the rest of the area was last year found to be too foul with weeds to carry a double crop. The remaining portion therefore of the rainfed area was cropped with single crops, including two new varieties of cumbu (*Pennisetum spicatum*), two of maize (*Sea Mays*) and two of cowpeas (*Vigna catyang*). Some of these show promise already of being useful varieties to this country. A large area was also grown with fodder cholam, which was grown with the double object of supplying fodder to the farm cattle and, by sowing very thickly, of checking and destroying weeds. A yield of about $4\frac{1}{2}$ tons per acre of dry fodder was obtained. Besides these crops, the area reserved for irrigated groundnuts in the hot weather was grown in the monsoon season with various crops, the objects being (1) to see how they affected the yield of the groundnut crop, (2) whether some crop could not be extensively grown on land commanded by wells which would pay the cultivator to grow rather than following an irrigated with a rainfed groundnut crop in the same year.

10. *Wet land crops.*—Sugarcane suffered considerably in the earlier stages of growth owing to scarcity of water as mentioned above. Latterly, however, it improved considerably and has given a very fair crop. The percentage of sucrose in the canes this year is abnormally high, the highest being "Ashy Mauritius" which contained 19·65. As most of the neighbouring sugarcane cultivators now have these Mauritius varieties of sugarcane, distribution of sets has been carried out further afield. In Perambalúr taluk of Trichinopoly district and in the southern taluks of North Arcot, canes have been distributed in small quantities, for planting, to selected cultivators and these have been planted under direct instructions and advice of one of the officers of this Agricultural station. Many applications have also been received from cultivators of other districts, viz., Salem, Tanjore, Madura and Tinnevelly. Where it was impossible for the applicants to obtain sets of these in their own district they have been supplied with a sufficient number of sets to enable them to establish the crop by the following year. As a result of last year's distribution from this agricultural station, excellent crops of these canes have been raised in the Tinnevelly district and several of the cultivators exhibited these canes at the Ettiyapuram Exhibition.

The wet land experiments with paddy have this year attracted much attention. In fact the improvements with this crop are very noticeable. The experiments are the same as those started last year, viz., spacing and manurial experiments. In addition to this, several varieties, local and from other districts, were also grown and compared. As the spacing experiments amply demonstrated the superiority both of seed grown from single seedling crops and of the method of planting with single seedlings, many applications were made by the local ryots for seed of their local variety. Seed of this is being distributed in a small quantity of seven Madras measures to any cultivator who guarantees that he will transplant one acre with this amount, the local seed-rate being 42 Madras measures. It is hoped that this will rapidly extend this improvement and that it will also show the ryots the value of selecting their seed. It is unfortunate that the quality of these wet lands is so variable and that there is always a large error in the duplicate plots of an experiment.

11. *Staff and touring.*—The strength of the staff has remained the same as last year. More time however has been spent by the officers in touring. The manager has toured in the Tanjore delta and frequently in the villages neighbouring the farm. He has also attended the jamabandi camps in Kallakurichi and Tindivanam taluks with the Divisional officer and the Collector respectively and as a result considerable interest has been aroused in the work of this station in the district. The manager has also visited the Koilpatti Agricultural station and has attended the Ettiyapuram and Arni Jaghir shows. One of the assistant managers has toured through the Perambalúr taluk for the introduction of Mauritius canes there, the names of suitable cultivators being taken when I toured through the taluk in July and August last. The other assistant manager is too inexperienced yet to send out and has confined his attention to making himself familiar with the local agricultural practice.

12. *Miscellaneous.*—The quarters for all the staff have been completed and are occupied. A further extension was made to the cattle shed to accommodate two more pairs of cattle transferred from the Attur Agricultural station. 14,000 lbs. of groundnut seed, 1,900 Madras measures of Banku paddy, 26,000 sugarcanes have been distributed during the year.

The Taliparamba Agricultural Station.

13. *Charge, object, area.*—This station has been under my charge throughout the year under report. The object with which it was started is the study and cultivation of pepper, but there are many other important problems which require investigation and which have found a place in the work of this farm. The area of the station has remained the same as last year.

14. *Staff and touring.*—The sanctioned staff of this station is now one manager, two assistant managers, one farm clerk and a peon. The addition of another assistant manager to this station this year was rendered necessary as the manager has to spend a considerable amount of time on tour. This year he was on tour for 189 days, 59 days in the South Canara district advising and instructing people who were desirous of growing groundnuts—a new and so far successful introduction into the district; and subsequently to inspect and report on these crops. The rest of the time 130 days he was touring in the Malabar district where recently a considerable interest has been taken in agricultural improvement and many are trying new methods of cultivation and new crops. The main lines of these improvements are those recommended by this department, viz., the cultivation of groundnuts, the introduction of Banku paddy as a second crop and economic paddy planting. In Palghat the groundnut crop has become established and requires no further assistance except so far as growing it in a proper rotation. In the other taluks where care has been taken and instructions followed, this crop has given excellent results, while applications now received for seed show that there is every likelihood of this crop becoming established throughout the whole of the warmer taluks of the district. In the neighbourhood of the farm also both the manager and assistant managers have toured. Here the chief improvements in the local agriculture at present lie in improving the cultivation of wet lands. The sugarcane crop which was introduced on to the farm in 1906-1907 has now to some extent spread in the neighbourhood of Taliparamba though nowhere, as yet on a large scale. Many visitors of the ryot class have been brought to visit the agricultural station by exhibiting specimen canes at local festivals. But the crop is still quite new to the people and they do not know as yet how to obtain the sugar from it. Jaggery making is now being demonstrated on the Agricultural station with a view to showing the value of the crop. The results of the jaggery making are most successful, an average of ½ lb. of jaggery being obtained from each cane crushed. The system of paddy cultivation as practised on the farm has also attracted much attention and improvements by ryots in the neighbourhood may be expected this coming year if advice and instructions are given.

15. *The season.*—The usual showers which fall in April and May were this year few and far between and dry weather continued until the monsoon burst on the 12th June. This was most unfortunate not only on the farm but in the West Coast districts as a whole as it is most advisable that the groundnut crop, which is now being introduced, should be established before the monsoon sets in and this is what most of the people who tried this crop failed to accomplish as often as not from no fault of their own. From 12th June till the end of August 124·27 inches of rainfall were recorded, more than half of which fell in July, *i.e.*, an average for that month of more than 2 inches a day. In fact, the last three weeks of the month the rain was practically continuous. Owing to the scarcity of rain before th e monsoon which retarded the flushing of the pepper and the continuous rain in July which prevented much of the berry from setting it was at one time thought that very little crop would be left. However the weather broke in August and much of the crop was thus saved. This year November and December were practically rainless, only ·30 inch of rainfall being recorded and as a consequence the pepper ripened prematurely, the picking being completed by 20th January 1909, while as is usual practically no rain fell from January until the end of the year.

16. *The pepper crop.*—In spite of the peculiar and generally unfavourable season the total yield of pepper has continued to increase year by year since 1907 as the following figures will show:—

	Total yield in Madras Measures.
1906	3,307¾
1907	1,095¾
1908	2,716⅛
1909	2,833⅞

As mentioned in previous reports, 1906 was an exceptional year when even the worst type of vines bore heavily. This refers to the general improvement of the gardens. A few of the earlier plantings of 1906 have this year commenced to bear a few spikes and from now onwards the vines planted since the farm was acquired will commence to come regularly into bearing. The improvements in planting referred to in last year's report have saved many of our cuttings. The death-rate in the hot weather being now only 20 per cent. instead of 40 per cent. in the case of Kalluvalli and 25 per cent. instead of 50 per cent. in the case of Balamcotta.

17. *Other crops.*—The paddy spacing methods were again demonstrated, but as the seed was selected specially from the plots raised from single seedlings the plots where 3 and 5 seedlings were tried gave better results, although in every plot there is a marked improvement in the yield. This was to some extent due to green manuring, but the same was noticed in crops

outside the station which were planted by ryots with our surplus seedlings which were sold to them. The following figures show to some extent this improvement:—

	Seed rate per acre.	Yield per acre of the whole of the wet landsunder paddy.
1906	... 40 Madras measures	... 548
1907	... 25 do.	... 592
1908	... 15 do.	... 791

Details of this demonstration will be found in the scientific report of this station.

The sugarcane crop introduced from Samalkota in 1907 still continues to attract much attention. It is impossible at present to estimate the value of this crop to the West Coast districts. The ratoon crop of 1907 gave nearly equal results to the newly planted crop in 1908 and this is now being ratooned for a second year. That it is likely to become important can be inferred from the fact that the actual cultivators themselves are this year coming forward for sets for planting.

The fibre crops which were grown on a field scale this year were not a success. Sunn hemp had to be ploughed in as green manure as it was badly infested with caterpillar. *Hibiscus cannabinus* was badly attacked by a weevil and every plant was stunted. Jute alone survived but gave only a fair crop, the soil evidently not being rich enough for this. The same was noticed in the case of jute in other parts of the district. In land near dwelling houses or where vegetable crops had been raised, the crop grew well but under ordinary field treatment and manuring it is doubtful if it will ever be profitable. Attempts have this year been made to improve the dry cultivation on the West Coast. The jungle land, referred to last year as having been broken up, has been utilised for the cultivation of ground-nuts. This has proved a great success; with ordinary manuring, *i.e.*, with 12 loads of cattle manure a yield of 1,524 lbs. per acre was obtained and with 6 loads of cattle manure and 6 of ashes, 1,981 lbs. were obtained in spite of the fact that sowing could not be done until 6th June 1908.

Besides this, several of the indigenous West Coast grasses have been planted out on 5 cent plots for observation. Of these, Amban pullu (*Andropogon contortus*), Ingi-kana pullu (*Panicum repens*) and Kuthiravali pullu (*Andropogon annulatus*) have remained green through the hot weather. Another grass collected in South Malabar, Chora pullu (*Anthistiria ciliata*) is also promising as also Guinea grass, but the last cannot from its habit be classed as pasture grass. This work will be extended this next year by mixing some of the best of those according to their habit. A further area of level jungle land has been cleared and other crops such as ginger and cassava and rotation cereals will be tried.

18. *Miscellaneous.*—The boundary fence has been handed over by the Department of Public Works. Four young bulls have been purchased at a cost of Rs. 29 and a new shed has been erected for them. These were bought with the object of utilising the hay and fodder grown on the farm and also to demonstrate the collection of cattle manure on the South Canara system. They will cost practically nothing to keep and may be sold or used to replace the present farm bullocks.

All the wells are being cleaned and repaired as well as stream and drain revetments.

TRICHINOPOLY,
8th May 1909.

H. C. SAMPSON,
Deputy Director of Agriculture, Southern Division.

THE ADMINISTRATIVE REPORT OF THE CENTRAL FARM AT COIMBATORE.

I have the honour to submit my yearly report for 1908–1909.

The weather during the year under report has been very unfavourable for agricultural operations.

The rains, which are usually received during April and May, were very slight, and the south-west monsoon set in late and gave very slight showers. The deficiency of rain began to be felt, however, during August, as the monsoon rains began to slacken on the hills and the water-supply to the tank supplying the wet lands failed, and, from the beginning of September, the water was supplied by turns once every ten days. A considerable area under the next tank above the one supplying the farm lands was not cultivated at all, and much land on the south of the river Noyil was cultivated as dry, being cropped with Bengal gram.

On the dry lands the lack of rain resulted in the loss of the season for sowing the main crop cholam, although as much as possible was done by the aid of the two showers received in September.

The first good rains were received during the first week in October when 1 inch was recorded. The north-east monsoon rains began on October 19th, and during the succeeding fortnight 10 inches were recorded. This rain fell nearly every day, with the result that it was almost impossible to work the land. From the beginning of November to the beginning of January there was an absolute drought. About 2 inches were received within the first week of January, and from that time forward no more was received till March 31st.

STATEMENT of rainfall for the year 1908-1909.

Number.	Months.	1	2	3	4	5	6	7	8	9	10	11
1	2	3	4	5	6	7	8	9	10	11	12	13
1	April	..	..	..	..	..	..	..	..	..	..	..
2	May	0·17	..	..	0·25	..	0·02	0·19	..	..	..	..
3	June	..	..	..	..	..	..	..	..	..	..	0·02
4	July	0·01	0·01	..	..	..	..	..	..	..	..	..
5	August	..	0·05	0·03	0·06	..	0·18	..	..	..	0·04	..
6	September	0·14	0·21	..	..	..	..	..	..	..	0·39	..
7	October	..	..	..	..	0·34	0·48	..	0·02	..	..	..
8	November	..	0·34	..	..	..	..	..	..	..	..	..
9	December	..	..	..	..	..	..	..	..	..	..	..
10	January	0·62	1·25	0·48	0·12	0·02	..	..	..	..	..	..
11	February	..	..	..	..	..	..	..	..	..	..	..
12	March	..	..	..	..	..	..	..	..	..	..	..
	Total	..	..	..	..	..	..	..	..	..	..	..

Number.	Months.	12	13	14	15	16	17	18	19	20	21	22
		14	15	16	17	18	19	20	21	22	23	24
1	April	..	..	..	..	0·42	0·36	..	..	0·01	..	..
2	May	..	..	..	..	..	..	..	..	..	..	..
3	June	..	0·02	0·11	0·09	..	..	0·06	..	..	..	..
4	July	..	..	..	..	..	0·08	..	0·04	0·11	0·01	..
5	August	..	..	..	..	..	..	..	..	..	..	..
6	September	..	..	0·29	..	..	..	..	..	..	..	..
7	October	..	..	..	..	..	..	0·01	0·17	0·58	0·86	0·78
8	November	..	..	..	..	..	..	..	..	..	..	..
9	December	..	..	..	..	..	..	..	..	..	..	..
10	January	..	..	..	..	..	..	..	..	..	..	..
11	February	..	..	..	..	..	..	..	..	..	..	..
12	March	..	..	..	..	..	..	..	..	..	..	..
	Total	..	..	..	..	..	..	..	..	..	..	..

Number.	Months.	23	24	25	26	27	28	29	30	31	Total.
		25	26	27	28	29	30	31	32	33	34
1	April	..	..	..	0·30	..	..	..	..	..	1·09
2	May	..	0·06	..	..	..	..	..	..	..	0·69
3	June	..	..	0·01	..	..	..	..	..	..	0·31
4	July	0·07	..	0·10	0·13	0·06	..	..	..	..	0·62
5	August	..	..	..	..	..	..	..	..	..	0·36
6	September	..	..	..	..	..	0·02	..	..	..	1·05
7	October	0·11	0·08	..	1·20	2·83	1·36	0·90	0·88	0·28	10·83
8	November	..	..	..	..	..	..	..	..	..	0·34
9	December	..	..	..	..	..	..	..	..	..	0·00
10	January	..	..	..	..	..	..	..	..	..	2·49
11	February	..	..	..	..	..	..	..	..	..	0·00
12	March	..	..	..	..	..	..	..	..	..	0·00
	Total	..	..	..	..	..	..	..	..	..	17·78

2. *Buildings.*—The staging for the grain store was fitted up during April and May and it has been found very convenient; the cranes asked for to enable heavy sacks and seed bundles to be easily hoisted up have not yet been fitted. The engine for running the machinery in the machine shed has been received, as have also the different machines to be installed, but they are still awaiting the necessary shafting which is being supplied by the Public Works Department.

The Government Botanist, on his return from leave in September, found that the one well existing in the Botanical Garden would not be sufficient to supply the whole of the garden; the Director of Agriculture was therefore asked to sanction the digging of a new well which would command the upper half of the garden; this was approved, and the site of an existing chucklers' drinking well being thought to be a suitable place, the well was dug. The result, however, was not as good as was anticipated; rock was met with at about 25 feet from the surface and water

was not reached for another 10 feet, and even then the supply was poor; the well was, however, taken down to a depth of 40 feet, and when left alone, contains about 15 feet of water. A bore hole will be put down in the bottom of this well as soon as the tools are available from the Public Works Department, when very probably a better supply will be struck.

Sanction for the construction of an additional byre for the cows was given by the Director of Agriculture, and plans prepared accordingly by the Public Works Department. The work was put in hand at the beginning of January, but has not yet been completed.

3. *Implements.*—The Ransomes R.I.S. plough continues to give good results in breaking up lands which are too hard for the country plough. On these soils it has so far not been possible to use the other deep working iron ploughs which have broad shares on account of the difficulty in getting them to enter the soil when it is at all hard. Massey's cotton soil plough has been used with good results.

The "beater drum" threshing machine, received towards the end of last year, has been used for all the crops on the farm with the exception of paddy. This machine, by allowing the work to be done more quickly, is of immense benefit when dealing with the produce of several fields and often several plots on one field, all of which have to be weighed, and the results recorded separately. It is, however, open to the objection that some of the grain is broken in the process; this appears to be due to the great dryness of the grain and consequent brittleness. The broken grain amounts to about 5 per cent. in the case of cholam and is readily separated by the winnowing machine; at the time when whole cholam was selling at the rate of Rs. 7 per salagie of 60 Madras measures, the broken cholam was valued at Rs. 5. Thus the monetary loss is about 1·42 per cent. In ascertaining the yield of the field the weight of broken cholam is added to the weight of the main portion. It may be possible to avoid this breakage by altering the speed of the machine, but in running with an oil engine there is not much latitude in the matter of speed, and, moreover, if the speed is much reduced, the threshing will not be complete.

For threshing paddy as it comes from the field the beater machine is not suitable as the straw tends to wind round the drum, causing the machine to block; therefore a "peg drum" machine was indented for and was received just in time for trial last paddy harvest. In this case again, the machine tended to husk the paddy to some extent, but this was evidently caused by the machine being speeded too fast; there was not however time to obtain the necessary new pulley, but by the next season one will be obtained, and better results are hoped for. The same remarks as to convenience when dealing with numerous small plots apply to this machine; on cholam, however, it does not work so well as the beater drum.

The small oil-engine and 3″ centrifugal pump was found very useful this season owing to the shortage of water on the paddy fields. On these fields there is a well, of no great depth, but with a very good rate of inflow, sufficient to enable the pump to run all day, every day. The cost for oil per day of ten hours amounted to Rs. 2 and the area irrigated to about 1 acre. Some ryots who saw it at work expressed the opinion that it was worth the expense in the saving of the crop.

4. *Cattle.*—On 23rd August 1908 a bad attack of foot-and-mouth disease occurred which ran through the entire herd, fortunately without causing any deaths, although the cattle were much reduced in condition; the yard was not quite free until 5th October 1908.

On 5th July 1908 a bullock was found suffering from some internal complaint which evidently caused it much pain by the way it writhed about. The Veterinary Hospital Assistant from Coimbatore was sent for, and he diagnosed the case as one of anthrax, although he was somewhat uncertain. Thereupon, the rest of the working cattle were inoculated with anti-anthrax serum. The sick animal recovered, and no other attacks occurred.

During the year 2½ pairs of working bullocks were purchased, but prices are now ruling very high in this neighbourhood for good cattle, some ryots having been known to give up to Rs. 400 for a good pair for working a mhote.

Cows.—At the end of the last financial year three cows and two heifers of the Kangayam breed were purchased from the Pattagar of Palayakottai, and during the year under report, two others were purchased from villages near Kangayam. These cows, however, do not give much milk, and in order to obtain the quantity required by the staff and students, recourse was had to hiring country cows in milk and returning them as soon as they run dry. The milk supply of the staff and students will necessitate the keeping of a considerable herd of cows, and if cows are purchased, it is considered that they should be as far as possible of "pure" breeds, either Kangayam, or of a small but active red breed; the milking capacity ought to be a secondary consideration, considering the great use that is made of cattle for draught purposes.

5. *Crops—Cotton.*—The results of the season 1907-1908, which were not available when the last report was issued, are given below.

There was practically only one picking as, owing to the scantiness of the rains received in April and May, the second flush of flowers which is usually obtained was very poor.

Experiments were made upon the following points: different mixtures of cotton and other grains, broadcast v. drill sowing, deep ploughing.

Results.

—	Area in acres.	Yield per acre lb. kappas.	Value of crop.	Cultivation expenses.	Gain.
			Rs. A. P.	Rs. A. P.	Rs. A. P.
Broadcast	3·33	435	31 5 0	7 12 0	23 9 0
Drilled	6·66	380	27 14 0	7 12 0	20 2 0
Deeply ploughed	47·0	378	27 7 0	5 15 0	21 8 0

The difference in the cultivation expenses is explained by the fact that the field in which the broadcast crop was grown was ploughed with the country plough and, previous to July 1st, 301 pairs of cattle were employed on the 47 acres whereas, on the deeply ploughed field, only 154 pairs were used on the same area up to the same date.

Results of the mixed crops.

—	Area in acres.	Yield in lbs.	Value per acre.	Total value per acre.	Cultivation expenses.	Gain.
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Cotton	16	296	21 5 0	34 13 0	7 12 0	27 1 0
Tenai		515	13 8 0			
Cotton	14	340	24 8 0	28 0 0	7 12 0	20 4 0
Horsegram		118	3 8 0			
Cotton	7	227	16 5 0	17 9 0	7 12 0	9 13 0
Coriander		42	1 4 0			

Yield of cotton is in lbs. of kappas per acre.

It will be noticed that the yield of the broadcasted plot is more than that of the drilled. The plots were arranged along the field each one chain wide, the broadcast plot being between two drilled. With regard to the mixtures, it will be seen that, although the yield of cotton is much lessened by the presence of the other crop, and conversely, the yield of the other crop is lessened by the presence of the cotton, yet when the yield of both crops is taken into account, the financial result is better than in the case of growing cotton alone

The field which had been deeply ploughed carried by far the best looking crop of cotton; the plants were all large and well grown but, as will be seen from the table, the yield was not commensurate with the growth. In the case of horsegram on the black soils here, it was noticed that the plants were more or less unable to form chlorophyll in their leaves and the leaves looked pale and sickly, and the whole plant looked stunted.

In this season 1908-1909 the rains failed practically till the first week in October, when the land was prepared as rapidly as possible using the Martins' cultivators more or less like country ploughs as they do more work in a day; but heavy rains set in on October 19th lasting up to the end of the month. Part of one field was sown with the gorru by the 25th, but the remainder of this field and all the others were sown only after November 1st, because the almost daily rain made the land unworkable. When the rains ceased it was found that the fields were too wet to sow with the gorru; therefore in order not to lose any more time, as much as could be was sown broadcast during the three or four days the land was drying sufficiently for the gorru. After this, the gorru was used for the remainder. As it happened, when once the rain ceased no more was received till the end of December, and the saving of time by not waiting for the land to dry is amply justified by the appearance of the crops, especially when in the case of the last field sown with the gorru fully half of the seed did not germinate till the rains at the end of the calendar year. It is, of course, true that the use of the gorru enables more land to be sown in a day by one pair of bullocks than can be done by broadcasting but, on the other hand, it is necessary to wait until the surface of the land has dried somewhat; otherwise the soil tends to clog the implement, and especially the guntika which is used for covering the seed. This waiting when the soil is full of water is very galling, especially when the season is already well advanced and when there are plenty of pairs of bullocks lying idle which could be put on the land to plough-in broadcasted seed. The rains received during the first week of January practically saved the cotton crop. At the time of writing the bolls are beginning to open, but the number of bolls is small and the yield of cotton will be poor. The results will be published in the next report.

6. *Cholam.*—Owing to the failure of rains no attempt could be made to sow the ordinary rain-fed yellow cholam on the black soils and the field intended for this crop on the black soils had to be sown with cotton. On the red soils attempts were made to sow it with the aid of the two showers received during September but in all but one field the sowing failed and re-sowing was necessary in the first week of October; this made the crop about six weeks late in starting, nevertheless the harvest occurred at about the same time.

Results—Rain-fed Cholam.

Field number.	Area.	Date of sowing.	Yield.		Value.	Cultivation expenses.	Remarks.
			Grain.	Straw.			
	ACS.		LBS.	LBS.	RS. A. P.	RS. A. P.	
1	1·33	7th October 1908.	578	3,216	29 15 0	11 5 3	First sowing failed.
2	2·55	7th October 1908.	580	3,201	30 4 3	9 13 3	First sowing failed.
4	4·60	7th October 1908.	692	3,113	33 12 0	10 15 7	First sowing failed.
7	1·75	8th October 1908.	460	1,659	21 12 0	17 8 2	First sowing partly failed. Irrigated at a cost of Rs. 6–12–0 per acre.
10	7·56	11th September 1908.	357	1,308	16 6 9	10 0 8	
31	3·85	6th October 1908.	346	3,087	21 15 8	7 11 9	
60-B	1·32	17th September 1908.	448	2,109	21 12 0	15 4 6	Irrigated at a cost of Rs. 4–9–6 per acre.

The yields of straw are those actually obtained but they are not comparable as, owing to the scarcity of fodder, some of the straw had to be weighed in a green state and given to the cattle instead of being allowed to dry in the field for the same time for each field. In the cases where the first sowing failed, reference is made to the attempts to sow with the aid of the two showers in September.

With irrigated cholam experiments were made upon the question of Ridge v. Bed transplantation and upon the quantity of water required by an irrigated crop of cholam upon soils similar to those on the farm. There was nothing particularly noticeable about the growth of the crop, but of course, it would have done better and would have cost less to produce if the usual amount of rain had been received.

Results—Irrigated cholam.

Field number.	Area.	Date of sowing.	Yield.		Value.	Cultivation expenses.	Irrigation expenses.	Remarks.
			Grain.	Straw.				
	ACS.		LBS.	LBS.	RS. A. P.	RS. A. P.	RS. A. P.	
5-B	1·73	25th April 1908.	1,543	3,484	51 4 0	35 12 0	11 10 0	Yellow.
5-C	1·70	9th April 1908.	1,138	4,229	38 15 5	22 3 6	12 5 8	Yellow.
6	2·10	28th March 1908.	1,197	..	42 1 8	29 13 3	12 6 0	White.
18	2·95	5th April 1908.	2,170	2,024	71 8 0	48 11 5	19 5 2	Yellow.
19-B	0·85	11th April 1908.	1,494	3,273	57 7 0	28 7 2	18 6 0	Yellow.
38	2·84	1st April 1908.	1,863	6,440	63 4 6	42 10 9	18 3 5	White.
43-A	2·27	5th April 1908.	1,253	3,830	43 14 0	35 4 9	16 11 10	Yellow.
52	2·27	27th March 1908.	1,520	..	52 5 10	29 3 0	11 3 6	White.

In the case of this cholam crop, owing to the want of fodder, the straw, as soon as the ears were removed was, in some cases, given to the cattle, without waiting for it to dry; hence the weights of straw are not comparable, but the value has been assumed at Rs. 4 per acre.

Ridge versus Bed transplantation.

Field.	Description.	Yield.	
		Grain.	Straw.
		LBS.	
18	Sown on ridges	2,933	..
18	Sown on the flat	2,817	..

Watering experiment.

Field.	Description.	Area of plot.	Date of sowing.	Number of waterings.	Number of cubic feet of water applied per acre.
		ACRE.			
18	Yellow cholam on ridges	0·25	6th April 1908 ..	3	30,605
18	Yellow cholam in beds	0·25	6th April 1908 ..	3	37,395

In the case of cholam, there is evidence of considerable gain in sowing on ridges and watering in the furrows both in the increased yield of grain and in the less amount of water required; but the great difficulty is to sow on the top of a ridge on account of the usually poor tilth obtained at the season of sowing, it very often being the custom to moisten the land by means of the mhote before ploughing the first time.

7. *Ragi.*—The usual crop of irrigated ragi was grown during the season, July to October. It was grown both on the flat and irrigated in beds and also on the sides of ridges and irrigated in furrows.

Manuring experiments were carried out with the object of comparing the values of the common poonacs with cattle manure and with mixtures of superphosphates and nitrogenous salts having regard to the amount which local ryots are prepared to spend on the usual practice of sheep-penning. The plots were long parallel strips laid off from north to south down the slight slope of the field. Thus the irrigation water could be let into each plot without materially interfering with those next to it. At harvest the outer rows of the plots were ignored and only the central portion of the plot taken for record. As the growth of the crop progressed it was noticed that there was a gradual falling off in the general appearance of the field as one passed from north to south, which would to some extent spoil the result. The manures were applied as follows:—

Cattle manure was applied at the rate of 15 cart loads per acre just before the formation of the ridges, poonacs were likewise applied before the formation of the ridges at the rate of 400 lbs. ground-nut, 400 lbs. white castor, 500 lbs. black castor. Superphosphate and half the ammonium sulphate was applied in the same way, superphosphate 200 lb. per acre, ammonium sulphate 150 lb.; the remainder of the sulphate and the whole of the nitrate of soda 112 lb. per acre were applied during the growth of the crop just before the third watering. Very little effect could be observed during the growth of the crop which might be put down to the effect of the manures and, as the table shows, the results are fairly uniform.

Ridge *v.* bed transplantation. This was carried out on two plots, each of 0·25 acre, which were at the same time the subject of watering experiments, *i.e.*, the water supplied was measured.

The result is disappointing from the ridge-planting point of view. The plants on the ridges never seemed to tiller thoroughly well this year and land was always visible between the rows, the ears also were formed very irregularly and not, as in bed planting, practically all at the same time.

Watering.—This was to ascertain the amount of water usually applied to a crop of ragi on soils such as those of the farm. At the same time a comparative test was made between ridges and beds.

The initial watering for moistening the land has not been measured and the first watering given in the table was that given when transplantation was taking place. The chief rainfall of the year came just at the end of the period of growth, but had it not been received or had the crop been started somewhat earlier, a sixth watering would have been necessary. The other rains received were practically negligible. When the results of the harvest of these two plots is combined with the method of planting, it will be seen that the beds give an extra yield of 296 lb. of grain worth Rs. 9 and an extra 3,380 lb. of straw worth, say, Rs. 2–4–0, whilst they require an extra 7,768 cubic feet of water (representing 18 hours work) costing approximately Rs. 2. Thus the beds have a total advantage to the extent of Rs. 9–4–0.

Thickly sown *v.* thinly sown seed beds. Since the usual method of sowing seed beds produces a thick mass of more or less weakly seedlings, it was considered desirable to try the effect of sowing seeds much more thinly. The usual seed rate is 4 lb. for a seed bed sufficient to transplant one acre, and for the thinly sown bed 1 lb. was sown on a bed sufficient to transplant one acre. The results show a decided advantage in favour of thin sowing. The part of the field in which the experiment was carried out was very much poorer than the rest and was somewhat badly attacked by insects, but the results may be said to be comparative.

Ragi irrigated, transplanted Field No. 20.

Plot.	Manure.	Area.	Yield per plot.		Yield per acre.		Remarks.
			Grain.	Straw.	Grain.	Straw.	
		ACS.	LB.	LB.	LB.	LB.	
2	No manure	0·12	241	789	2,008	6,575	....
13	Do.	0·12	169	431	1,408	3,592	....
1	Groundnut cake	0·114	272	846	2,386	7,421	400 lb. per acre.
4	Do.	0·12	243	781	2,025	6,508	....
5	Black castor cake	0·116	235	752	2,025	6,483	500 lb. per acre.
11	Do.	0·112	166	472	1,482	4,214	....
3	Superphosphate and sulphate of ammonia.	0·112	210	774	1,878	6,910	200 lb. super 150 lb. sulphate.
6	Do.	0·12	244	715	2,037	5,958	....
7	White castor cake	0·116	219	661	1,888	5,698	400 lb. per acre.
9	Do.	0·12	220	649	1,837	5,408	....
8	Superphosphate and nitrate of soda ..	0·12	226	711	1,883	5,925	200 lb. super 112 lb . nitrate.
10	Do.	0·12	203	604	1,692	5,033	....
12	Cattle manure	0·12	176	522	1,467	4,350	15 cart loads per acre.
14	Do.	0·116	177	496	1,526	4,276	....

Ridges v. Beds.

Method.	Area.	Yield per plot.		Yield per acre.	
		Grain.	Straw.	Grain.	Straw.
	ACS.	LB	LB.	LB.	LB.
Transplanted on sides of ridges	0·25	540	1,761	2,160	7,044
Transplanted in beds	0·25	614	2,606	2,456	10,424

Difference in favour of beds 296 lb. worth Rs. 9.

Thickly sown v. Thinly sown seed beds.

Method.	Area.	Yield per plot.		Yield per acre.		Remarks.
		Grain.	Straw.	Grain.	Straw.	
	ACS.	LB.	LB.	LB.	LB.	
Thickly sown seedlings ..	0·16	149	390	931	2,438	Seed rate 400 lb. per acre of seed bed.
Thinly sown seedlings	0·164	197	589	1,201	3,591	Seed rate 100 lb. per acre of seed bed.

Watering Experiments.

Method.	Area.	Number of waterings.	Number of cubic feet.	Total number of cubic feet per plot.	Total number of cubic feet per acre.
	ACS.				
Transplanted on ridges	0·25	1st	1,491	7,632	30,528
		2nd	1,125		
		3rd	1,375		
		4th	1,191		
		5th	2,450		
Transplanted in beds	0·25	1st	1,758	9,574	38,296
		2nd	1,425		
		3rd	1,925		
		4th	1,725		
		5th	2,741		

Difference in favour of ridges per acre, 7,768.

8. *Wheat.*—This was grown as usual between November and March. Owing, however, to the drought it was entirely grown with irrigation. The results are shown in the table. Field No. 6 where the cultivation expenses run to Rs. 72–5–7 with irrigation expenses of Rs. 41–3–6 was irrigated by a mhote fitted in the Bellary manner, that is, two pairs of cattle are used for one cavali. The bullocks actually lifting the water run down a very steep slope, and when at the bottom, the rope is unhitched and the bullocks allowed to walk up a less steep, but longer, path, forwards to the top. The man himself is helped up the steep slope by the pull of the bucket descending into the well, when at the top a second pair of bullocks are hitched on to the rope and the process repeated. This method undoubtedly enables a bucket of water to be drawn out of the well in less time than in the case of the less steep Coimbatore slope, but the quantity raised per hour is not more than 25 per cent. greater than in the case of an ordinary mhote, and the expense is just double. Had this field been irrigated with an ordinary mhote it is probable the irrigation expenses would not have been much more than Rs. 30 as the well is somewhat deeper than the others on the farm. In the case of field No. 18, the high charge is due partly to the fact that extra men had to be employed when the quantity of water was measured in working the secondary lift of 4 feet, and partly due to the fact that the soil cracked rather badly and consequently a large quantity of water was required for proper irrigation; moreover this field was somewhat heavily manured with fish manure which did not give an adequate return.

Field 43 C is a very stiff clayey field inclined to be saline upon which rain water will stand for days before soaking in; irrigation on this field is therefore very efficient as regards the area covered per day. The field is one which is particularly suitable for wheat but for other crops such as cholam it is very poor.

Wheat.

Field No.	Area in acres.	Yield per field.		Yield per acre.		Value grain and straw.	Total cultivation expenses.	Irrigation expenses.
		Grain.	Straw.	Grain.	Straw.			
		LB.	LB.	LB.	LB.	RS. A. P.	RS. A. P.	RS. A. P.
6	2·10	2,647	5,070	1,260	2,415	59 7 3	72 5 7	41 3 6
(*a*) 18	2·95	5,823	8,690	1,974	2,946	81 12 3	80 12 4	37 13 5
(*b*) 38A	1·85	2,620	5,057	1,416	2,733	60 4 10	52 15 6	21 2 6
(*c*) 38B	0·99	1,138	2,825	1,149	2,853	49 8 5	52 5 0	24 15 5
39	1·10	1,812	1,972	1,647	1,793	68 4 10	50 6 4	27 14 4
40	0·44	758	1,550	1,723	3,523	74 4 4	50 1 3	27 11 2
43B	1·37	2,538	4,949	1,853	3,612	78 15 2	50 5 8	23 14 4
(*d*) 43C	1·12	1,994	3,242	1,780	2,895	75 1 10	41 9 7	17 8 9

(*a*) Cost of manure Rs. 18– 3–4 per acre.
(*b*) „ „ „ 10–10–0 „
(*c*) „ „ „ 6– 2–2 „
(*d*) This field is a peculiarly stiff one and well suited to wheat. In fact it is very difficult to grow cholam at all well up on it. The low irrigation expenses may be explained by the retentive nature of the soil.

9. *Paddy—Season.*—Water was received about the middle of July and the work of preparing seed-beds and ploughing the land generally was pushed on. Water failed, however, at the beginning of September just when most of the transplantation was finished; about two acres, however, had to be left and this latter area was transplanted at the beginning of November with banku and manavari.

After the failure of the rains water was supplied to the farm lands by turns, twelve hours' supply every 10 days. In order to supplement this the portable engine and 3″ pump was employed to irrigate, from a well, the area devoted to spacing experiments and to the thick *v.* thin seedlings experiments.

Owing to the failure of water-supply the yields this season are on the whole low.

Manuring experiment.—This was designed to compare the value of Kolingi (*Tephrosia purpurea*) with Errukam (*Calitropis gigantea*) as a green leaf manure, the latter being highly esteemed in this locality. At the same time white castor cake, black castor cake (which is cheaper but contains more oil), mixtures of bones and nitrate of soda, bones and sulphate of ammonia, ashes of sugarcane, ashes of sugarcane and ammonium sulphate were tried. The manures were all applied to plots which each received water direct from a channel, and the last field of the row devoted to a given manure was left unmanured to see if water running from manured fields had any appreciable effect on the next unmanured field. The basis of manuring was the cost of applying five cart-loads of green leaves per acre, the cost per cart-load being given as Rs. 3 including the collecting and fetching from often great distances. The cost of the poonacs and bones alone and green leaf manures are thus approximately the same. The ammonium sulphate was added to the bones in one case to see whether paddy would respond to ammonium salts, similarly with nitre. The cost of these two manures, however, is prohibitive. The two plots manured with ashes of sugarcane were to test a statement often made that the ashes obtained from the furnace when making jaggery are of no use as manure. They must, however, contain a very considerable amount of potash and phosphates. In one case 1 cwt. per acre of ammonium sulphate was added to make up for the deficiency in nitrogen.

Manuring experiment with paddy variety " sinna samba ' .

No.	Manure.	Area of plot	Yield per plot.		Yield per acre.		Cost of manure.
			Grain.	Straw.	Grain.	Straw.	
		ACS.	LB.	LB.	LB.	LB.	RS. A. P.
C-1.	Erukkam	0·393	931	1,948	2,369	4,955	15 0 0
	Do. unmanured	0·098	245	232	2,500	2,367	
C-2.	Kolingi	0·327	929	1,372	2,841	4,196	15 0 0
	Do. unmanured	0·12	301	428	2,508	3,564	
C-3.	Castor, white	0·355	1,103	1,748	3,107	4,924	11 14 0
	Do. unmanured	0·145	353	408	2,435	2,814	
C-4.	Castor, black	0·323	960	1,532	2,972	4,743	11 13 0
	Do. unmanured	0·091	180	192	1,978	2,110	
C-5.	Bones	0·281	726	1,132	2,584	4,028	13 6 0
	Do. unmanured	0·092	164	200	1,782	2,175	
C-6.	Bones and ammonium sulphate ..	0·271	740	1,204	2,730	4,445	29 6 0
	Do. do unmanured.	0·09	173	204	1,922	2,265	
C-7.	Bones and nitrate of soda	0·264	601	668	2,276	2,530	30 0 0
	Do. do. unmanured.	0·139	298	324	2,144	2,330	
C-8.	Ashes of canes	0·282	779	924	2,762	3,275	
	Do. unmanured	0·139	311	368	2,237	2,647	Waste product.
C-9.	Ashes of canes and ammonium sulphate.	0·276	737	682	2,670	2,470	16 0 0
	Do. unmanured ..	0·069	176	168	2,550	2,435	

The manures applied were as follows in lb. per acre :—

Plot		LB.
1.	Erukkam leaves, green	4,000
2.	Kolingi leaves, green	4,000
3.	White castor poonac	400
4.	Black castor poonac	500
5.	Bones, ground, raw	500
6.	Bones do. do.	500
	Do. and ammonium sulphate	112
7.	Bones, raw, ground	500
	Nitrate of soda	150
8.	Ashes of sugarcane	4 cart-loads.
9.	Do.	4 do.
	Ammonium sulphate	112 lb.

The unmanured plots given in the table are in each case the last field of a series through which the water must pass from the corresponding manured plot before draining away by a channel.

The manures have in all cases except erukkam given an increased yield over the corresponding unmanured plot. The unmanured plots in the series of spacing experiments which have received no manure for the last four seasons give the following yields :—

	No.	LB.
Compared with ...	A-1	2,238
	A-9	1,804
	C-1	2,500
	C-2	2,508
	C-3	2,435
	C-4	1,978
	C-5	1,782
	C-6	1,922
	C-7	2,144
	C-8	2,237
	C-9	2,550

It thus appears that in the case of the green leaves, white castor poonac, and ashes ammonium sulphate, there is evidence of a washing of manures on to the next lower field by the irrigation water. In the case of soluble salts, like ammonium sulphate, this is perhaps to be expected. The cane ash, it will be noticed, has given a yield which is only about 80 lb. per acre less than that given by Kolingi, but that the addition of ammonium sulphate has only had a depressing effect. The best results have been given by the poonacs, white being superior to black.

Age of seedlings and transplantation and thickness of sowing in seed bed.—Two experiments were conducted on each of these points. The "old" seedlings were 40 days old and in the case of all the other they were 24 days only. The "thin" sown seedlings were from a seed-bed sown at the rate of $\frac{3}{4}$ Madras measures per cent. of land, and the "thick" sown, from a bed sown at the rate of $4\frac{3}{4}$ measures per cent. of land—

	Area.	Yield per plot.		Yield per acre.	
		Grain.	Straw.	Grain.	Straw.
	ACS.	LB.	LB.	LB.	LB.
Seedlings, 40 days old	0·179	533	992	2,977	5,540
Do. 24 days old	0·228	592	976	2,597	4,280
Do. from thickly-sown bed	0·215	494	740	2,298	3.442
Do. from thinly-sown-bed	0·206	553	840	2,684	4,078

The older seedlings have given a much superior yield, but the thinly-sown bed shows a decided advantage over the thickly-sown bed. This would be explained by the greater strength of the seedlings from the former owing to the greater space for development of the seedlings.

Pati Mannu substitutes.—At the request of the Director of Agriculture a series of plots was set aside for the trial of the mixtures devised by the Agricultural Chemist as substitutes for the pati mannu used in the Kistna district. The results are shown in the following table :—

Number.	Description.	Area.	Yield per plot.		Yield per acre.	
			Grain.	Straw.	Grain	Straw.
		ACS.	LB.	LB.	LB.	LB.
1	No manure	0·0375	119	96	3,173	2,560
2	Bone meal and potassium sulphate.	0·0657	98	72	1,491	1,096
3	Castor poonac, bone meal and potassium sulphate.	0·035	113	120	3,228	3,429
4	Do. do.	0·049	113	140	2,306	2,858
5	Castor poonac, bone meal, super phosphate sulphate of potash.	0·042	94	112	2,238	2,664

The manures were obtained from Messrs. Stanes & Co., and Messrs. Pierce, Leslie & Co., and were made up according to the formulæ given by the Agricultural Chemist.

PADDY.—*Yield of main crop and varieties.*

Description.	Area.	Yield per plot.		Yield per acre.	
		Grain.	Straw.	Grain.	Straw.
	ACS.	LB.	LB.	LB.	LB.
Sinna samba	12·54	28,725	40,720	2,291	3,247
Sadai samba	12·74	25,717	27,435	2,019	2,153
Tuluka samba	0·072	153	301	2,125	4,181
Banku	4·34	3,355	5,375	773	1,238
Palagumasari	0·086	111	122	1,291	1,419
Turpu sanna akkulu	0·109	169	233	1,550	2 138
Sinna samba (selected white)	0·176	284	536	1,614	3,045
Sinna samba (selected from a prolific plan).	0·298	1,019	1,076	3,419	3,611
Rasangi	0·076	163	170	2,145	2,237
Atharali samba	0·086	101	121	1,174	1,407
Vellai Milagai	0·11	190	184	1,727	1,673
Sirumani (Tanjore)	0·107	234	384	2,187	3,589
Sirumani (Udamalpet)	0·088	263	368	2,989	4,182
Kinnabithu	0·047	95	156	2,021	3,319
Kayami	0·04	69·5	78	1,738	1,950
Athicari	0·037	21	32	568	865
Jeerasali	0·034	56	114	1,647	3,353
Godumi samba	0·073	222	296	3,041	4,055
Anna samba	2·305	3,764	3,898	1,633	1,691
Garika sonna vari	0·055	59	72	1,073	1,309
Banku (selected white)	0·06	52	58	867	967
Gandasali	0·058	100	231	1,724	3,983
Manavari	0 044	31	35	705	795
Anai kumban	2·7	4.962	4,612	1,838	1,708
Ramabhanam	1·8	2,636	3,320	1,464	1,844
Garudan samba	1·26	2,290	2,296	1,817	1,822

The result of the paddy-spacing experiments are shown in the following table:—

Number.	Description.	Area.	Yield of grain per plot.	Yield of grain per acre.	Yield of straw per plot.	Yield of straw per acre.
		Acs.	LB.	LB.	LB.	LB.
1	No manure	0·227	508	2,238	670	2,951
2	Single, 9" apart	0·303	680	2,244	972	3,208
3	Double, 9" apart	0·257	596	2,319	640	2,490
4	Treble	0·275	688	2,502	804	2,923
5	Single, 6" apart	0·302	672	2,225	780	2,582
6	Single distance of closed fist	0·325	859	2,643	1,248	3,840
7	Local method	0·362	726	2,006	1,040	2,873
8	No manure in alternate years	0·421	722	1,715	1,072	2,546
9	No manure	0·435	785	1,804	1,144	Manured last year. 2,630

The following is a comparative statement of the results of the spacing experiments for the years 1907–1908 and 1908–1909:—

Methods.	1907–1908. Grain in lb. per acre.	1908–1909. Grain in lb. per acre.
1. No manure	2,252	1,953
2. Local method	2,782	2,006
3. Single distance of closed fist	3,050	2,643
4. Single, 9" apart	3,208	2,244
5. Double, 9" apart	3,422	2,319
6. Treble, 9" apart	3,509	2,502

10. *Sugarcane.*—An area of 3·13 acres has been planted on the wet land with red, striped, ashy Mauritius canes and local Poovan, Namam and Vellai. At the time of writing the canes are not ripe, but it may be remarked that the growth this year has not been good. The Mauritius canes have been attacked with "serai" disease (a disease of unknown origin manifested in the enormous number of grass-like tillers and a few stunted canes at each stool). The local Vellai cane has grown better than any of the others.

On the dry land two fields having a total area of 3·3 acres were planted under well irrigation. The fields were somewhat lowlying but only in heavy rains could they be said to be water logged. The same varieties were planted as on the wet land, but the growth has been very poor. A considerable area has almost entirely died out, in fact the plants on this area died before they reached 3 feet in height. Ashy Mauritius was the variety planted on the area which died away. At the time of writing, the cane is not yet ripe and results must be deferred to the next report.

11. *Minor crops.*—The varieties of American cowpeas (*Vigna catiang*) have again done very badly due to the drought. They made very poor growth and further were very badly attacked by a Dipterous borer which made the stems hollow and infested the hollow space with numberless grubs. The local varieties of *Vigna catiang* were similarly attacked. Sufficient seed of each variety has however been saved for further trial.

The varieties of kaffir corn and milo maize from America have done very well indeed. The grains are large and the heads well filled. The plants have however a somewhat dwarf habit which may tell against them in the opinion of the ryots as the yield of fodder will be lessened. Next season sufficient land will be sown to enable some of the seed to be given to the maistries and others for cooking and report as to the flavour, etc.

Cajanus Indicus.—On account of the dry weather in August this had to be sown in furrows 6 feet apart and water had then to be let in to cause germination. The seed was sown fairly thickly and afterwards thinned out. A very fair crop was obtained, but no cereal could be grown between the rows and the crop was grown at a loss. The varieties of *Cajanus indicus* received from the United Provinces likewise did badly. Sufficient seed has however been saved for further trial.

Ground-nut.—Mauritius and small Japanese were the two varieties grown in the north-east monsoon season on two of the lightest fields on the farm. They were both dibbled in immediately after the rain received in the middle of September. The early growth was fair and blanks were filled in during the first week in October. Owing however to the fact that no rain was received after 31st October till 31st December, the crops had a hard time. At Christmas the Mauritius variety was suffering very badly from sirul and the plants were drying up. They had also scarcely covered the ground although sown 1 foot apart, and all flowers had ceased forming. At this time the Japanese did not look so bad, in fact it seems able to stand drought much better than Mauritius and doubtless had it been sown more closely would have

yielded a fair return. The rains at the end of December helped both crops immensely, but the yield at harvest was of course very poor. Mauritius only yielded 140 lbs. per acre but Japanese 543 lbs.

12. *Staff.*—On 18th June 1908, Assistant Manager L. S. Natesaiyar was transferred to the Bezwada farm as Manager and on 19th September 1908 Assistant Manager Muthusami Aiyar was appointed in his place. On the abolition of the Saidapet College and Farm the staff were transferred to Coimbatore. M.R.Ry. S. P. Swaminathan being appointed as Assistant Manager, before joining his post however he took leave and, at the expiry of his leave, resigned his appointment. On 23rd December Assistant Manager K. Krishnamurthi Rao was transferred to the Agricultural Chemist's office as Assistant, and M.R.Ry. Subramania Sastri, the late bailiff of the Saidapet Farm who had been appointed as clerk in the College office, was appointed Assistant Manager in his place. The Manager throughout the year was T. V. Rajagopalachari. The staff as a whole worked well during the year although no one can be singled out for any special notice.

COIMBATORE,
1*st May* 1909.

C. J. W. SHEPPERSON,
Principal and Superintendent.

APPENDIX II.

REPORT ON THE COLLEGE OF AGRICULTURE, COIMBATORE, FOR 1908–1909.

I have the honour to submit herewith my report on the working of the Agricultural College, Coimbatore, for the first session, 1908–1909.

The College of Agriculture, Saidapet, ceased working at the end of the term ending in December 1907 and Government sanction for the opening of the College at Coimbatore for teaching was received on 8th May 1908. During March and April the Chemical and Physical apparatus, College library, and Records were sent up from Saidapet and housed temporarily in a room in the new college which was sufficiently finished as to be available. The Principal's Clerks' office was handed over on 22nd October 1908, when it became possible to rearrange and assort the records of the Saidapet College which are very numerous. The library is at present accommodated in the room intended for the Principal's private room.

Owing to the fact that the college was not sufficiently completed for occupation in any other rooms and to the fact that the presence of students undergoing instruction would, in the opinion of the Engineers, seriously interfere with the progress of the building operations, it was decided to commence teaching temporarily in the unfinished quarters of the Government Botanist, who was on leave till September; on his return a move was made to the Rest House on the Farm, in three rooms of which the college work was conducted, two being fitted as a chemical laboratory and the other as a lecture room. This arrangement was fairly satisfactory, but the accommodation was somewhat cramped especially in chemical laboratory work; practical work in Physics had to be in abeyance and that in Botany and Entomology had to be carried on under great difficulties.

The class was opened on June 17th by the Director of Agriculture who delivered a short address on the occasion.

As the sanction for the construction of the hostels was not received till long after the class had been started, the students were accommodated in several of the "C" type quarters designed for the subordinates of the Government Botanist whose office was still in Madras. It is hoped, however, that by the beginning of the next session there will be sufficient hostel accommodation for the two classes, of twenty each, who will come into residence then.

Eighty-seven applications for admission were received out of which twenty were selected, of whom four non-matriculates, appearing to be such as had great interest in Agriculture as they all possessed large areas of land, were exempted by Government under rule 11 requiring candidates to have passed the Matriculation; all these students, it has been found by experience, are able to follow the lectures, although they may be somewhat slow in grasping some of the subjects.

The castes of the students are—

Native Christians	3
Mahommedan	1
Brahmins	11
Kshatriya	1
Vellala	1
Other Non-bramin caste Hindus...	3

The class as a whole worked well until the beginning of this calendar year, when plague broke out in the town of Coimbatore and, as it appears that somewhat alarmist reports were made in the newspapers, several students were recalled by their parents or guardians and the others shortly afterwards represented that they were afraid to go into the town to get their necessary provisions. Application was therefore made to close the college for the long vacation from March 1st instead of from April 1st. This request was granted and the college closed accordingly. The first year students will assemble on May 3rd next to complete the remainder of their course.

2. In *Agriculture* the work was purely practical, the students being from the first given work in the fields on three mornings in the week at various farm operations as they happened to be necessary.

At first they felt considerable difficulty in handling the plough and managing a pair of bullocks, but after a little time they became more or less proficient. Some little difficulty was experienced in arranging work under one supervisor for so large a number as twenty students at a time, whenever they were required to work with any implements beyond the plough and the hand hoe; arrangements have, however, been made by which it is hoped this difficulty will be avoided in future. In a few instances they appeared to work more or less perfunctorily, but on the whole they seemed to take interest in their work.

3. In *Physics* the work was done entirely by lectures as the accommodation was such that laboratory work was impracticable. The progress was satisfactory but suffered from being purely theoretical.

With regard to *Botany* and *Entomology*, the Government Botanist reports as follows:—

4. *Botany.*—"The Botanical teaching during the year consisted of 87 class meetings, 30 of which were lectures and 57 practical. The course was one of ordinary elementary Botany. The Morphology of the higher plants was discussed and demonstrated, the histology of the tissues briefly explained and somewhat full lectures and demonstrations given on elementary physiology of plants The latter subject was not completed because of the sudden closing of the college. In the absence of proper appliances for dissecting and microscopic work and a suitable room for teaching, the work was conducted under considerable difficulties. An examination at Christmas showed that the students were keenly interested and the results were fairly satisfactory."

5. *Entomology.*—"Twenty-nine class meetings were held in Entomology during the year. Most of these were in the field.

Lectures were given on the general structure of the various types of winged insects, the life history of a butterfly and a grasshopper, the several orders into which the group of insects is divided, the mouth parts of insects and their division according to food habits. These lectures were aided by demonstrations and the students were trained in making sketches in their note books.

In the field the students were taught to look for insects and to observe their modes of locomotion and feeding habits, to note their organs and to place them in their natural orders. The students were taught to make field notes and their note-books were periodically examined. Young stages were sought for and collected and these were bred out, but, owing to lack of appliances, this was largely done by the lecturer and demonstrated to the students. The pests found on the farm were examined, as occasion offered, and the students were given short notes as to their general destructiveness.

An examination was held at Christmas but the projected one in March was postponed because of the abrupt closing of the college."

6. As to *Chemistry*, the Agricultural Chemist reports as follows:—

"During the whole of the year under review this work was carried out in temporary quarters at first in the bungalow constructed for the Government Botanist and latter in the rest house. Both the lecturer and the students were greatly handicapped by the very limited amount of space available and the want of a water-supply and efficient heating apparatus and much credit attaches to the lecturer M.R.Ry. M. R. Ramaswami Sivan Avergal, B.A., for the manner in which he carried out his duties under these circumstances. As the lectures were made as experimental as possible the students showed great interest in them.

7. *Inorganic Chemistry.*—Forty-seven lectures were delivered in this subject and these included the general principles and laws of chemistry, the occurrence, preparation and properties of the common non-metals and their chief compounds, and the source, preparation and properties of the metals of importance in agriculture, together with those of their chief oxides and compounds.

8. *Organic Chemistry.*—In this subject 41 lectures were given, dealing in a general manner with the preparation and properties of the more important classes of carbon compounds. The fatty compounds were dealt with in fair detail, but the cyclic compounds were only treated in a very general manner.

The lectures in both inorganic and organic chemistry were on the whole of an elementary character and they were amply illustrated with experiments.

9. *Practical Work.*—Altogether 92 class meetings of three hours duration each were held and the course of studies was carefully selected so as to give as much purely experimental work to the students as possible. Only the minimum instruction in analytic processes, sufficient to carry out the experiments, was imparted to the students.

At first individual attention is given to the students who are shown how to observe and make deductions and afterwards when they have become more self-reliant they are left alone to their own resources as much as possible. By means of printed sheets they are shown how to carry out the experiments upon which they must make and write down their own observations and deductions. By adopting this method of teaching it is hoped to make the students observant and show a greater interest in their work. The course of work included—

(*a*) The methods of laboratory manipulations.

(*b*) The preparation and the study of the properties of oxygen, hydrogen, nitrogen, ammonia, carbon-di-oxide, and the different phosphates of lime.

(*c*) The composition of air and water and the testing of natural waters.

(*d*) The recognition of bases and acids met with in soils and manure.

(*e*) The carbo hydrates and the determination of cane sugar, glucose and starch.

Oils fats and soaps and the recognition of the chief Indian oils.

Preparation of glutin and albumen and the properties of albumens generally.

(*f*) The pore space and water absorbing power of soils. The retention of manurial constituents. The estimation of nitrogen in soils and manures. Available and non-available plant food conditions governing nitrification in soils.

Owing to the college closing one month earlier it was not possible for the students to study the composition of milk and dairy products and feeding stuffs. During the ensuing year an endeavour will be made to make this course even more purely experimental than at present.

It is not to be expected, nor is it claimed that this course of studies is in any way capable of producing analysts, but such a course should teach the students to be observant and enable them to understand the relations of Chemistry to Agriculture. A special course of studies will be arranged for students wishing to specialize in Chemistry.

During the ensuing year the Agricultural Chemist will give the lectures in "General Chemistry" and the First Assistant in "Agricultural Chemistry."

10. An athletic club has been started but owing to the chaotic condition of the land set apart for the playing ground, due to the building operations, the students have not been very enthusiastic in the matter of games this year. The college is fortunate however in having such an athletic enthusiast as M.R.Ry. M. R. Ramasami Sivan, the lecturer in Chemistry, and doubtless the Club will do great things in the future.

COIMBATORE,
6th May 1909.

C. J. W. SHEPPERSON,
Principal and Superintendent.

APPENDIX III.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST, 1908–1909.

I have the honour to submit herewith the annual report of the Government Botanist for the year ending 31st March 1909.

Changes in the staff.—During the absence of the Government Botanist, M.R.Ry. Rao Bahadur C. K. Subba Rao Avargal continued to act until June 5 when, in his untimely death, already reported, the department suffered a very severe loss. The Director of Agriculture took charge of the office until 7th August, and then Mr. Shepperson, until he handed over charge to Dr. Barber on September 15.

There were no changes in the subordinate staff during the year.

2. *Work of the Government Botanist.*—The late Acting Government Botanist, who was in poor health, toured in the Anamalais in company with the assistants in systematic and economic botany and made a few collections, but the projected tour to the Nilgiris had unfortunately to be given up.

The following papers, written by M.R.Ry. Subba Rao, were published in the Agricultural Journal of India:—Fish Manure in Madras, Nendrum Plantain of the West Coast, Tobacco in South Canara, seed on *Nymphæa Lotus.*

3. Dr. Barber was on study leave for ten months during his stay in England and the chief part of this fell during the year under review. He visited Reading, Wye, Kingston, Kew, Cambridge, Oxford, various institutions in London, the Royal Holloway College, Manchester, Liverpool, New Castle, Leeds, Edinburgh, Glasgow and Dublin. He studied the farms and

botanical gardens at these places, the systems of agricultural education and the botanical and entomological laboratories. He carefully examined the implements at the Royal Agricultural Shows and acted on Mr. Gupta's Committee at the Franco-British Exhibition.

At the request of the Director of Agriculture a special study was made of fruit-preserving apparatus and the factory of Messrs. Chivers at Histon was gone over. Plans were drawn for the biological rooms in the Coimbatore College.

He attended courses of lectures at Cambridge in advanced physiology and the diseases of plants and continued his studies on root parasites. A paper was read before the Cambridge Philosophical Society on this subject and one on the Haustorium of *Cansjera Rheedii* was published in the memoirs of the Agricultural Department of India. Materials were collected for a paper on *Ximenia americana* but this is unfinished.

At the Royal Gardens, Kew, the Madras Grewias were studied with the assistance of Mr. J. R. Drummond, I.C.S., and the pepper collections were examined at Kew, Glasgow and Edinburgh.

4. Upon his return to India, the first few months were spent in touring round the farms of the Presidency. He spent 126 days on tour during the half year, most of which was devoted to Coimbatore, but Samalkota, Taliparamba, Bellary, Hagari, Nandyal, Palur, Trichinopoly, Koilpatti and Ettayapuram were also visited.

The office was finally transferred to Coimbatore on March 15. A considerable portion of time was spent during the latter portion of the year in making arrangements for the transfer of the collections, and this process is still going on continuously.

5. Some attention was paid to the library of the department. The work of the librarian was overhauled, a comprehensive list was prepared of all the missing parts of the periodicals, a new scheme was inaugurated for the distribution of papers to officers not at head-quarters and proposals were framed for the institution of separate small libraries for the Deputy Directors.

6. The teaching at the college was supervised and rough syllabuses were drawn up for the courses in Elementary Botany (first year) and Agricultural Botany (second year). Sets of prepared lectures were obtained from the Botanical and Entomological lecturers; these were criticised and the latter were forwarded to the Imperial Entomologist for remarks.

The work of the entomological assistants was closely followed, tours arranged for both, reports called for and examined and forwarded to the Imperial Entomologist. A report was prepared by the Government Botanist for the Board on the possibility of infecting with disease the scale insects attacking coffee.

7. The area of the farm placed apart for a botanic garden, a deserted village full of stones and prickly-pear, was early taken in hand and roads and paths laid out. Lattice-work trellises were erected for the protection of the plants from the scorching winds and a plant house was built. Seed and cutting beds were laid down and large quantities of plants were obtained from the Madras Agri-Horticultural Gardens. It is now thought that a better source of supply will be found in Bangalore whose climate is more similar to that of Coimbatore.

The land was got into order and numerous experiments were made in growing trees, shrubs, climbers, flowering herbs, and grass lawns for the proposed laying out of the College compound. The avenue of the Lawley Road was overhauled, sickly or missing plants were replaced and a system of propping and pruning was introduced. A scheme was prepared for the laying out of the college compound. This horticultural work, in the absence of any subordinate capable of undertaking it, occupied the bulk of the Government Botanist's spare time.

8. Scientific work was largely confined to the training of the Economic Assistant and subordinates in Mendelian crossing experiments and the study of De Vriese's mutations.

For the former purpose, Gogu (*Hibiscus cannabinus*) was selected and, under instructions from the Director of Agriculture, a thorough study of the cottons of the Presidency was commenced. The ground-nut (*Arachis hypogæa*) was studied as to its mode of fertilisation and crossed, but these subjects will be referred to in more detail under the work in Economic Botany.

For mutations it was necessary to select some wild plant, and the choice fell upon *Euphorbia* of the section *Anisophyllum*. Numerous forms were collected in various parts of the Presidency, sown in the garden and their variations studied. A full set with drawings and descriptions has been sent to Mr. Drummond at Kew Gardens. There are indications of the need of a thorough revision of their systematic position and it appears probable that several new species have been collected.

9. *Systematic Botany.*—This work has been a good deal interrupted during the year. Owing to the absence of Dr. Barber, the Assistant, M.R.Ry. C. Tadulingam, was in charge of the office for most of the time and prepared the draft annual report for the previous year. Upon the transfer of the Economic Assistant to Coimbatore for teaching purposes in June, he had to deal with economic questions and, when the transfer of the office took place, he had to superintend the packing of the collections.

He was on tour for 41 days during the year. He accompained the Acting Government Botanist on his tour to the Anamalais and made a few collections. He was also deputed to attend the Agricultural Show at Nagpur, and the preparations for this work took the best part of two months.

About 2,500 sheets were added to the collection and the number of sheets to be sent to Calcutta was materially increased. A number of plants were named for various correspondents, chief among whom were the Deputy Directors and Professor Fyson of the Presidency College. The valuable herbarium was kept in good condition during the year.

10. *Economic Botany.*—The Assistant, M.R.Ry. T. S. Venkataraman, accompanied the Acting Government Botanist on his Anamalai tour. He collected plants for the Reporter on Economic Products and made enquiries into gogu, agave and plantain fibres.

A fieldman was deputed to the Ganjám hills to obtain specimens of fibre known as "Labæ" (*Cryptolepis Buchananii*) and "Tamalœ" (*Dregea sp.*) for the Reporter on Economic Products, and spent two months on this work.

11. Upon the return of Dr. Barber to India the work in Economic Botany was pushed forward rapidly and the Assistant was kept hard at work for the rest of the year. His first duty, besides teaching, was the superintendence of the Botanic Garden. At the same time, as already mentioned, studies were commenced in the crossing of plants.

Four varieties of *gogu* raised from Vizagapatam seed were being grown in isolated plots on the farm by the Principal. These were closely studied and numerous crosses were effected. Altogether 90 flowers were crossed and the proceeds were planted in 11 plots in the Botanic Garden. These were reaped and a second series of crosses effected in which about 100 flowers were crossed. The plants were studied and drawn at five or six different stages and the results recorded.

The study of *cottons* was a more serious and difficult piece of work. About thirty varieties were collected and sown. In these plots some 400 flowers were crossed and 600 self-fertilised, most mornings and evenings being spent in the garden. Careful studies of the plants were made at different stages of growth and herbarium specimens added to the economic collection. Drawings and paintings were made of all the chief varieties and numerous seed and kappas analyses were made. The latter work was chiefly done by the Government Botanist who also studied the crops at Hagari, Bellary and Nandyal. A number of natural crosses were noted in the fields, marked and examined.

With the idea of possible improvements in the *ground-nut* crop a study was made of the so-called cleistogamic flowers and the natural mode of fertilisation. About 100 flowers were fertilised artificially, and the resulting fruits will be sown in the next experiment.

The teaching work of the Economic Assistant has been reported elsewhere. About 87 classes were held during the year.

12. *Mycology.*—The Assistant in Mycology, M.R.Ry. S. Sundararaman, continued to be on special duty in the Gódávari district, investigating the palm disease, until 19th October. He was then recalled to Madras and on 15th November he was sent to Pusa for a two years' course of training under the Imperial Mycologist.

13. *Entomology.*—Work in this section was continued on the lines previously laid down. The following insects received special attention:—

The paddy stem-borer (*Schœnobius bipunctifer*), its sexual characters and habits.

A paddy seedling pest from Malabar (*Ancylolomia chrysographella*).

A cocoanut pest from Cochin (*Parasa lepida*).

The natural enemies of the green scale (*Lecanium viride*) in the coffee plantations in the Nilgiris.

A pepper berry borer (a chrysomelid beetle) at Taliparamba.

A hairy caterpillar (*Creatonotus albistriga*) on cumbu in South Arcot.

14. The First Assistant, M.R.Ry. T. V. Ramakrishna Aiyar, had regular touring until July when he was transferred to Coimbatore to take charge of the teaching. He was 84 days on tour. Before his transfer he visited North Malabar, Laccavaram in the Kistna district, Bangalore in company with the Second Imperial Entomologist and the Government Entomologist of New South Wales, and the Ellore Cattle Show. During the Michaelmas and Christmas vacations he visited Nandyal, Bezwada and Samalkota farms.

15. The Second Assistant, M.R.Ry. Y. Ramachandra Rao, was 213 days on tour. He devoted the first two months of the year to the study of the paddy stem-borer at Hagari. He visited Palur, Cochin, Panikuppam in South Arcot, Taliparamba and, on two occasions, the Nilgiris in connection with tea and coffee diseases.

16. Three demonstrations in Entomology were given at shows during the year. The First Assistant was present at the Ellore Cattle Show and demonstrated the chief agricultural pests. At the Tinnevelly Teachers' Exhibition a set of coloured plates with descriptions in English and Tamil was exhibited. At the Agricultural Show at Arni an important series of common pests

was displayed, paintings with descriptive letterpress exhibited and the most up-to-date remedies and instruments demonstrated. A fieldman was in charge of the exhibit during the whole of the show.

17. The entomological collections were constantly overhauled, new material was added and some new and interesting pests noted. Numerous small sets of insects were forwarded to the Imperial Entomologist. All reports, after perusal by the Government Botanist, were sent on to the Imperial Entomologist, whose help during the year has been invaluable.

18. The two entomological assistants went to Pusa in March to attend the annual gathering of Provincial assistants in this subject. They also received instruction in sericulture, cattle pests, lac cultivation and bee-keeping.

The teaching in entomology has been reported elsewhere. About 30 classes were held during the year.

19. The work of the artist has been on the whole satisfactory. He was deputed to Pusa for three months to undergo training in painting insects under the Imperial Entomologist. Upon his return he painted seven plates of insects in the collection. Three plates were prepared of plants attacked by insects and the chief varieties of cotton in the garden were painted.

COIMBATORE,
Dated 28th May 1909.

C. A. BARBER,
Government Botanist.

APPENDIX IV.

REPORT OF THE AGRICULTURAL CHEMIST FOR THE YEAR 1908-1909.

In submitting this the first annual report of the Agricultural Chemist, it is necessary to preface it with a historical account of this section of the Department of Agriculture so as to bring the whole up to date.

2. The Agricultural Chemist arrived in Bombay on November 14th, 1906, and reported himself in Madras on the 20th November 1906, when, as no laboratory was available, he was transferred to the Imperial Agricultural Research Institute at Pusa. The whole of the time spent at Pusa was given to the study of the methods of analysis in use there and the opportunity was taken to analyse several kinds of Madras soils. The Agricultural Conference held at Cawnpore in February 1907 was attended by the Agricultural Chemist.

In May 1907 the Agricultural Chemist returned to Madras and was placed in possession of a temporary laboratory at the College of Agriculture, Saidapet, and there he was joined by his assistant M.R.Ry. P. A. Subrahmanya Aiyar, B.A., who had previously been undergoing training at Pusa for a period of one year and four months.

Chiefly through lack of suitable apparatus and chemicals the laboratories at Saidapet were unsuited for carrying out much analytical work and in consequence the Agricultural Chemist spent much time in drafting out a course of lectures and practical work for the future students of the Agricultural College at Coimbatore. At this time it was understood that the course in chemistry would extend over three years, but since then the time allotted has been curtailed and it has since become necessary to redraft this work.

3. On December 27th, 1907, the office of the Agricultural Chemist was transferred to Coimbatore and as some of the apparatus ordered for a temporary laboratory was received early in 1908, it was found possible to commence work in the bungalow constructed for the Government Botanist who was absent on leave.

The staff was strengthened on 6th March 1908 by the engagement of M.R.Ry. M. Parameswara Aiyar Avargal as Second Assistant and this enabled the Agricultural Chemist to undertake the analysis of sugarcanes at Taliparamba and Samalkota.

4. Notwithstanding the inconveniences attached to the Saidapet laboratory it was found possible to carry out several simple investigations :—

(*a*) *Saline soils.*—Samples of saline soils and sub-soils were taken from the Sivaganga estate and carefully analysed. As this land had been under experimental cultivation for many years the variation in the amount and composition of the saline salts were of great interest.

(*b*) *River silts.*—Samples of black and red silts brought down by the Hagari river were collected and examined both chemically and physically. The results showed that the black silt was identical in every respect with the black cotton soil around Hagari, but that the red silt was very different, and probably would have the effect of increasing the fertility of soil to which it was applied in quantity.

(*c*) *The effect of wet cultivation methods on soil.*—Samples of soil taken from various paddy fields in a very circumscribed area were analysed. The fields had been under wet cultivation for periods varying from two to more than a hundred years and as the soil of this area is remarkably uniform in character it was possible to get a fair comparison between the various samples. The results were embodied in a report submitted to the Director of Agriculture and it is hoped to carry on the investigation as soon as opportunity occurs.

(*d*) *The mechanical analysis of soils.*—A method of analysis was worked out which could be applied uniformly to all Madras soils.

(*e*) During the year ending 31st March 1908 the following analyses were made and reported upon :—

Soils	16
Manures	27
River silts	13
Saline soils	9
Sugarcanes and cane products	48
Ground-nuts	32
Oil seeds	3
Miscellaneous	1
Total	149

5. *Tours.*—From May 1907 to 31st March 1908, the Agricultural Chemist was on tour for 32 days and the members of his staff for 18 days.

1908–1909.

6. During the whole of the period under review the work was carried on in temporary quarters at first in the Government Botanist's bungalow and after his return from leave in the rest-house. The new laboratories were handed over on 23rd March 1909 and by the end of that month most of the apparatus and chemicals had been removed into it.

Several changes occurred on the staff. M.R.Ry. M. Parameswara Aiyar Avargal left on the 30th September 1908 to take up an appointment as analyst at the "King Institute", Guindy, and much difficulty was experienced in filling the vacancy as time could not be spared for the training of a man who had no knowledge of the rudiments of agricultural analysis. Finally choice was made of M.R.Ry. K Krishnamurti Row, an Assistant Manager on the Central Farm and an old student of Saidapet Agricultural College, who was appointed on probation on 23rd December 1908.

M.R.Ry. M. R. Ramaswami Sivan Avargal, B.A., the Chemical Assistant at Saidapet, was appointed to the post of First Assistant and his duties are solely connected with the teaching of the students.

The staff as at present constituted is as follows:—

Agricultural Chemist	W. H. Harrison, Esq., M. Sc.
First Assistant	M.R.Ry. Ramaswami Sivan, B.A.
Second „	P. A. Subrahmanya Aiyar, B.A.
Third „	K. Krishnamurti Row.
Head Clerk	P. A. Ragunathaswami Aiyangar.
Second Clerk and Storekeeper	K. S. Subrahmanyan.

7. During the year the following samples were analysed :—

Saline soils	31
Poonacs	10
Sugar canes and sugar products	25
Fodders and grasses	37
Manurial earths	15
Soils	15
Fish manures	4
Farm-yard manures	11
Miscellaneous manures	7
Ground-nuts	1
Miscellaneous	6
Total	162

8. The analytical work requiring special mention is as follows :—

(*a*) *Saline soils.*—In conjunction with the Deputy Director of Agriculture, Southern Division, Trichinopoly, a plot of saline soil in the Periyár Delta was thoroughly sampled and upon the results of the analyses proposals were made for dealing with the problem in the district.

Samples of saline soils were received from the Director of Agriculture from the land under the tank at Ponnalur and a report on the analytical features was submitted in due course.

(*b*) *Pati Mannu.*—The Director of Agriculture having drawn the attention of the Agricultural Chemist to the scarcity of this manurial earth and the consequent lack of manure in the Kistna Delta, an assistant was deputed to tour the district to obtain a series of samples of the earth and to get full information concerning it. From the information received and analytical data obtained from the samples, two different types of mixed manures were made and distributed by the Deputy Director of Agriculture, Northern Division, to selected ryots in the delta. These plots were inspected by the Agricultural Chemist just before harvesting and *in March* 1909 he toured through the delta in company with the Deputy Director of Agriculture, Northern Division, in order to obtain a piece of land suitable for experiments. In the ensuing year it is proposed to institute experiments having as their object the production of a cheap and efficient substitute for Pati Mannu. Mixed manures will also be distributed to a few selected ryots.

(*c*) *Fodder grasses.*—The nutritive values of a number of grasses at different stages of their growth were determined. These grasses were supplied by the Acting Government Botanist in May 1908.

(*d*) *Ground-nuts and Ground-nut soils.*—The Manager of the Taliparamba Farm, when touring in South Canara, noticed at certain places that the ground-nuts, although large and apparently normal, were devoid of kernels. Samples of the nuts and soils were forwarded and the latter upon examination was found to practically contain no lime. As the soil in other respects was normal it is probable that this deficiency of lime is the cause of the non-formation of kernels and it is proposed to test this when a pot-culture house is available.

(*e*) *Central Farm soils.*—All the fields of this farm have now been sampled and a little analytical work upon them has been carried out. This will be continued during the ensuing year whenever other work permits.

(*f*) *Investigations.*—The temporary laboratories were small and offered few conveniences for such work and the staff was fully occupied with other work. Notwithstanding this, preliminary work was carried out on the following lines :—

(1) The character and composition of South Indian black cotton soils.
(2) The bacterial reactions of Coimbatore soils.
(3) The fermentation changes occurring in soils under wet cultivation.
(4) The role played by soil humus under South Indian climatic conditions.

These investigations will be continued during the ensuing year.

Teaching Section.

9. A separate report will be submitted in conjunction with the Principal's report upon the working of the Agricultural College, Coimbatore, but it is necessary to refer to the subject *in this* report as much time was given by the Agricultural Chemist to the drafting of a properly co-ordinated course in general and agricultural chemistry suited to students who are not making a speciality of the subject. The whole endeavour has been to frame a course which will give the students a sufficient grounding in the principles of chemistry and agricultural chemistry to intelligently follow future lectures in those subjects into which chemistry enters. In practical work the analytical processes have been reduced to a minimum sufficient to enable the students to work out experimentally such problems as the conditions affecting nitrification and de-nitrification, the retention and non-retention of manurial constituents by soil, etc.

10. *Tours.*—During the year 1908–1909 the Agricultural Chemist was on tour for 66 days and the members of his staff for 68 days.

COIMBATORE,
24th April 1909.

W. H. HARRISON,
Agricultural Chemist.

II

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I

I have the honour to submit the Annual Report of the Civil Veterinary Department for the year 1908–1909.

2. The Office of the Superintendent, Civil Veterinary Department, was held by me throughout the year, and that of the Principal of the Madras Veterinary College until 1st February 1909, when it was handed over to Mr. D. Aitchison, I.C.V.D. (*vide* Board's Proceedings, No. 270, Mis., dated 25th January 1909). In addition to my work at head-quarters I spent 130 days in camp, and travelled 13,035 miles by rail and 392 miles by road, paid three visits to the Veterinary Hospital at Coimbatore, two to those at Madura, Trichinopoly and Vizagapatam and one to those at Tiruvannámalai, Cocanada, Pithápuram and Vizianagram. I attended the cattle shows held at Madura, Tiruppúr, Párvatîpuram, Berhampúr, Pithápuram, Koilpatti, Ongole and Ellore. I visited Kodaikánal on three occasions, and inspected the progress of work in connection with the Rinderpest experiment carried on by Mr. D. Aitchison, I.C.V.D. These experiments proved that the hill cattle experimented upon were partially immune to the disease, and were not sufficiently susceptible for the purposes for which it was proposed to establish a manufacturing laboratory. The results were reported to the Board. During the year under report six new veterinary hospitals were opened and four more (viz.) at Sivaganga in Madura district, Tinnevelly Bridge in Tinnevelly district, Ongole and Rapur in Nellore district will soon be started, the necessary buildings having almost been completed. I had occasion to inspect the Quarantine Depot at Tuticorin four times. After inspection of cattle at Virudupatti and Méttupálaiyam, I selected two stud bulls in Mysore for the use of Uganda estate.

3. Mr. D. Aitchison, I.C.V.D., was a probationer till 1st February 1909 when he was appointed Second Superintendent and Principal of Madras Veterinary College. He spent six months in Kodaikánal in connection with the Rinderpest experiments referred to above, one month in the inspection of Government stallions stationed at Coimbatore, Satyamangalam, Tiruppúr, Kangayam, Palayakotta, Dhárápuram, Pollachi, Hosúr, Kollegal, Vedasandur, Hosúr, Krishnagiri and Madura and he also assisted me at the cattle show held at Berhampur. As was expected, the department was further developed by the entertainment of eighteen more Veterinary Assistants and one more Veterinary Inspector, and by the starting of six veterinary hospitals. It is however very necessary that there should be at least three Veterinary Inspectors, as the inoculation work is being conducted all over the Presidency.

II.—Veterinary College.

4. The only change in the staff of the Madras Veterinary College during the year was the appointment of Mr. D. Aitchison, I C.V.D., who assumed charge on the 1st February 1909 as a full-timed Principal, in accordance with the recommendation of the Board of Examiners in their report, dated 19th December 1908.

5. The numbers of students on the rolls in January 1908 (*i.e.*) at the commencement of the calendar year were six in class A (first year's class), 21 in class B (second year's class) and 24 in class C (third year's class). The numbers were augmented in the beginning of the second session, viz., 24 in class A, 21 in class B and 29 in class C. Of these 15, 20 and 29 continued till the end of the year and appeared before the Board of Examiners.

6. As this will be my last opportunity of reporting upon the working of the Madras Veterinary College, I beg to submit below a tabular statement showing the number and percentage of passes of each class since the opening of the college.

	Class A.			Class B.			Class C.		
	Number presented.	Number passed.	Percentage passed.	Number presented.	Number passed.	Percentage passed.	Number presented.	Number passed.	Percentage passed.
1906	28	19	67·9	25	15	60·0	21	12	57·1
1907	19	16	84·2	24	20	83·3	23	17	73·9
1908	15	11	73·3	20	16	80·0	29	24	82·8

7. It will be seen that the percentage in class C during the year compares favourably with that of the previous year. But in the case of classes A and B the Board of Examiners made the following remarks: "We regret to notice a falling off both in numbers and quality of the students in A and B especially in A and we do not consider that the material in this class can in any way compare with that in class C." The poor material referred to in class A is evidently due to want of sufficient inducement to passed men to seek admission into the college and the consequent enlistment of unpassed men.

8. I am pleased to be able to state that the attendance and discipline of students in all classes were satisfactory. The final year students were afforded frequent opportunities for making surgical operations and doing other practical work in the pharmacy, and students of all classes were required to attend to the treatment of sick animals under the superintendence of the senior students and lecturers.

9. During the year under report the hospital attached to the college has continued in popularity. The marked increase in the number of cases admitted, in the number of operations performed and the amount of fees realised during the year as compared with the previous year is strong evidence in point.

10. The tabulated statement below will give an idea of the progress made since the opening of the college:—

Year.	Total number of patients treated.	Receipts. RS. A. P.
1903–1904 from October	778	... 2,238 4 6
1904–1905	1,981	... 6,364 12 1
1905–1906	2,213	... 7,091 13 1
1906–1907	2,249	... 6,846 7 10
1907–1908	2,313	... 8,438 0 0
1908–1909	2,873	... 11,462 0 0

The number of operations performed during the year is shown below:—

Animals.	In-patients.	Out-patients.
Horses	258	100
Dogs and others	112	288
Bovines	114	48

11. With a view to relieve the Resident Surgeon from a portion of his heavy work, Veterinary Assistant A. Douglas was appointed as Hospital Surgeon to assist him in the discharge of his hospital duties.

12. During the year, some valuable additions were made to the library and some beautiful veterinary specimens were contributed to the Museum.

13. The diplomas and prizes were distributed to veterinary graduates by the Hon'ble Mr. M. Hammick, C.S.I., C.I.E., I.C.S., who kindly consented to preside on the occasion. The cost of prizes was met by the handsome and voluntary donations received from certain private gentlemen and ladies, some of whom have evinced keen interest in veterinary matters.

14. Several students manifested special aptitude for gymnastic exercises and sports, and some won prizes in inter-collegiate sports.

15. The hostel attached to the college had the full complement of 23 students throughout the year, but further accommodation for students who were anxious to live in residence is urgently needed. The health of the students was good throughout the year. Two small plots afforded a supply of guinea grass and lucerne for the in-patients of the hospital and was of great benefit to the sick and delicate animals.

III (*a*)—Cattle Disease.

16. During the year under review the total loss of cattle from disease was 216,451 and from other causes 13,063 against 152,834 and 14,552 respectively shown in the previous year, but I do not consider that these figures are at all to be relied upon. A glance at the comparative statement shows that the number of deaths have steadily increased since 1904. This can only be accounted for by the fact that the village officials take more pains to report deaths of cattle. It is frequently reported by Veterinary Assistants that cattle death registers have not been kept up, and as greater attention has recently been directed to cattle epidemics, more reports have been submitted ; but it will be a long time before we can rely with any certainty upon accurate reports being sent in. The loss was particularly heavy under Rinderpest, Anthrax, Epizootic Aphtha and unspecified diseases. Rinderpest alone contributed 65·2 per cent. of the total mortality. On the other hand, there was a falling off under the heading of Malignant Sore-throat and Black Quarter.

17. Outbreaks of rinderpest were of very virulent type in South Arcot, Madura, North Arcot, Coimbatore, Tinnevelly and Chingleput districts, and caused deaths of 23,393, 23,049, 15,695, 13,519, 11,715 and 10,242 animals respectively. The total mortality due to this outbreak was 149,666 against 97,244 in the previous year. With a view to curb it by means of preventive inoculation and treatment, a Veterinary Assistant was permanently posted to each of these districts. Anthrax, epizootic aphtha and unspecified diseases were responsible for the deaths of 12,511, 4,578 and 38,100 cattle, respectively. To criminal poisoning were attributed 26 deaths, and to wild animals 11,412.

18. Preventive inoculation against rinderpest was undertaken in 22 districts and that against anthrax and hæmorrhægic septicæmia in five and two districts, respectively. Fifty thousand four hundred and eighty-seven head of cattle were inoculated against rinderpest, 2,353 against anthrax and 477 against hæmorrhægic Septicæmia as against 28,914, 8,461, 1,179 of the last year.

19. The total loss among horses and ponies was 288 from diseases, 10 from snake-bite and 109 from wild animals.

20. In this Presidency, inoculation as a preventive measure against rinderpest has come to be generally recognised as a useful prophylactic, and this is shown by the increasing number of animals which owners have voluntarily permitted or asked to be inoculated. At first the greatest obstruction was experienced, but this stage may be said to have definitely passed. The following figures will show the steady increase of inoculation work, with the exception of the year 1906–1907, during which year I was on leave in England for six months.

Year.	Rinderpest.	Anthrax.	Hæmorrhægic septicæmia.	Total.
1902–1903	..	377	..	377
1903–1904	2,805	6,329	..	9,134
1904–1905	8,251	12,437	..	20,688
1905–1906	12,689	19,631	833	33,153
1906–1907	11,043	8,856	679	20,578
1907–1908	28,914	8,461	1,179	38,554
1908–1909	50,487	2,353	477	53,317

21. During the year the Imperial Bacteriologist has devised a new process by which the special vaccine for charbon symptomatique or quarter ill may be inoculated into animals, and this department has indented upon the Muktesar Laboratory for 5,000 pillules and five sets of instruments specially designed for inserting these hypodermically.

III (*b*)—Veterinary Hospitals.

22. At the commencement of the year there were eleven hospitals at work and during the year six new ones have been opened, one in each of the following towns :— Cocanada, Rajahmundry, Trichur, Ellore, Tiruvannámalai and Tanjore.

Of these hospitals, four located in Madras, Saidapet, Rajahmundry and Ellore are maintained by Government; eight (viz.) in Madura, Tanjore, Trichinopoly, Vellore, Coimbatore, Vizagapatam, Cocanada and Tiruvannámalai are supported by, and are under the management of, the local Boards concerned, four in Vizianagaram, Pithápuram, Trichur and Pudukkóttai are carried on by their respective Rajahs and one in Bellary is carried on under the auspices of the Society for the Prevention of Cruelty to Animals.

23. The total number of in-patients and out-patients treated in these institutions is shown in statement No. V, and the amount of Receipts and Expenditure in statement No. VI. It will be seen from these statements that the total number of animals treated in all these institutions, with the exception of Pudukkóttai and Trichur for which figures are not available, is 35,234 and the average patients for each institution is 2,349 or about 7 patients per diem. As compared with the previous year, there was an increase in the number of attendances in almost all the hospitals, and this may be particularly noticed in those of Madras, Trichinopoly, Vellore and Coimbatore. It may thus be inferred that the benefit of Veterinary Institutions is becoming more widely recognised and popular.

IV (*a*)—Pony Breeding Operations.

24. At the commencement of the year there were 13 stallions at work, "Ophir" having been destroyed in January 1908. They were all located in the Coimbatore, Salem, and Madura districts as in the previous year.

25. Eight stallions were stationed in the Coimbatore district. Of these, Hector which was located in Kollegal covered only 3 mares up to November 1908. He was then attacked with lameness and was brought down to Madras for treatment. As the disease was found incurable, he was destroyed in December 1908.

26. "Jumna" and "Punch" were stationed at Kangayam throughout the year, and covered 23 and 28 mares respectively as against 17 and 27 during the previous year.

27. "Ali" was at Coimbatore for the most part of the year and covered only 8 mares against 9 in the previous year.

28. "Rahiman," "Turk" and "Mustapha," whose services were required in Pollachi, Satyamangalam, and Tiruppúr, covered 25, 10 and 22 mares respectively against 17, 17 and 21 during the previous year.

29. "Ahmed," who was stationed at Dhárápuram, had 34 coverings to his credit against 33 in the previous year and thus maintained his reputation for the highest number of coverings in the Coimbatore district.

30. In the Salem district, stallions "Carbon" and "Selim" stationed in Harur and Krishnagiri, respectively, served fewer mares while "Sunshine" showed a decided improvement over last year covering, viz., 29 against 21.

31. In the Madura district "Sheik" located at the Veterinary Hospital was not at all in favour, and I would recommend that he be disposed of.

32. "Samawy's" services were in great requisition both at Palni and Vedasandur where he served 36 mares against 35 in the previous year.

33. The total number of coverings made by the 8 stallions in the Coimbatore district was 153 against 186 in the previous year. The decrease is probably due to loss of stallion power caused by the death of "Ophir" and the stallion "Hector" becoming unserviceable in the latter portion of the year.

34. In the Salem district the total number of coverings was 47, *i.e.*, 10 less than in the previous year. This was due to the fact that only 3 stallions worked in the district during the year, while 4 worked last year. In the Madura district, the total coverings were 39 against 41.

35. On the whole, there were 239 coverings against 284 in the previous year, which gives an average of 17·5 per stallion approximately against 21 last year.

36. *Results of coverings.*—Of 284 coverings made during the previous year in the Coimbatore, Salem and Madura districts, results of coverings have been reported only in 185 cases, although the certificates of coverings were returned in time to the Tahsildars concerned for report. From the reports received, it would seem that 30 foaled, 5 aborted, 47 were in foal, 78 proved empty, 10 doubtful, 5 foals were dropped dead, 1 mare died, 9 were sold or their whereabouts not traceable.

37. *Castrations.*—These operations were carried on in the districts of Coimbatore, Salem and Madura by the three Salustries, Abdul Sathar, Sheik Ahmed and Abdul Rahiman. Two ponies and 161 bulls were castrated in Dhárápuram and 28 ponies and 15 bulls in Kollegal taluks in the Coimbatore district. Eighty-one bulls were castrated in Hosúr in Salem district and 4 ponies and 5 bulls in Madura. The total number of the operations performed during the year was 296 against 301 in the previous year.

38. *Cattle-breeding.*—At the commencement of the year, there were 19 bulls employed at stud, of which 8 were purchased only in March 1908, at the Ongole cattle show. They were distributed among 5 districts as shown below :—

3 in Tinnevelly.
1 in Madura.
2 in Madras (Veterinary College).
11 in Guntúr.
and 2 in Vizagapatam.

One of the bulls No. 11 stationed in Tinnevelly district died during the year. Arrangements are being made for recording the number of stock obtained by the remaining bulls in the mufassal. For the 2 bulls located in the Madras Veterinary College a register of coverings has been maintained and it would seem therefrom that they covered 126 cows during the year. It is hoped that the results of these coverings may be obtained for next year reports.

IV (*b*)—Cattle Fairs and Shows.

39. A number of cattle fairs were held during the year in several districts. Only to a few important fairs noted below were Veterinary Assistants deputed to enforce the Cattle Diseases Act 11 of 1866 :—

1. Sivalaperi in Tinnevelly district.
2. Kanniseri ,,
3. Thimmarajapuram ,,
4. Kazhugumalai ,,
5. Tiruchendur ,,
6. Melmalayanur in South Arcot district.
7. Subrahmaniyapuram in South Canara district.

According to the reports submitted by the Veterinary Assistants deputed to watch these fairs about 68,950 animals were gathered and exhibited for sale, and it is satisfactory to note that no epidemic broke out amongst them. Occasion was nevertheless taken to show to the people assembled the method and benefits of preventive inoculation.

40. As full reports have already been submitted concerning the several cattle shows, I now only propose to deal briefly with each —

Berhampur Cattle show-(Ganjám) was held on the 27th, 28th and 29th January 1909. These shows are now held annually and have become popular with the cultivating classes. The number of entries was 537 against 244 shown in the previous year, and the great feature of this fair was the large number of pairs both of bullocks and buffaloes. The Government medal was awarded to the best Brahmini bull.

41. *Pithápuram Cattle show* was held on the 6th, 7th and 8th March 1909. There were 413 exhibits. The cows exhibited showed much quality and were mainly of the Ongole type. Eighteen Brahmini bulls were brought in for exhibition,

and it is to be hoped that many of them may be exchanged for better ones. There was also a large show of poultry, chiefly consisting of game fowl. The Raja of Pithápuram takes great interest in this show and is also a large exhibitor.

42. *Vizagapatam District Cattle show.*—The show which is held annually at different centres in the Vizagapatam district, was held this year at Párvatipur. The show was a most popular one, and the number of animals exhibited, (viz.), 517 was very satisfactory. The cows were of good quality, but the feature of the show was the magnificient lot of pairs of bullocks and buffaloes. Some of the buffaloes were over a hundred inches in girth. One of the finest breeds of buffaloes in India is raised in this neighbourhood.

43. *Ellore Cattle show.*—It was held in April 1908 and was an improvement on that of last year. In all 390 animals were exhibited, and the most notable feature was the large number of cows exhibited. This may be explained by the fact that cattle dealers from Ongole brought a large number in the hope of making good sales and securing some of the prize money. The District Board, however, were sufficiently progressive as to buy two bulls for the members of their Agricultural Association.

44. *Madura Cattle show* was held on the 17th and 18th April 1908 in connection with the great Chitrai festival. It is computed that upwards of 10,000 head of cattle were present, but only a certain number were selected from them for exhibition. The only animals worthy of note were the pairs of the Mysore type. There were large numbers of the small Pulikolam breed shown from which are selected the celebrated "Jellikut bulls," used for "baiting," a sport much in vogue in the Madura district. The cows exhibited were beneath contempt.

45. *Tiruppúr Cattle and Pony show.*—This old show was resuscitated after being for several years in abeyance. There was a very large number of exhibits comprising the Kangayam breed of cattle and those of the Mysore type which are largely bred in the Bagor Hills in the north of Coimbatore. But the feature of the show was the large—for Madras—number of ponies exhibited which were largely the produce of the Government pony stallions.

46. *Ongole Cattle show.*—The date of the holding of this celebrated show was postponed owing to an outbreak of foot and mouth disease in the neighbourhood, but as it was originally fixed for the early part of March it is included in this year's report. The number of animals exhibited was somewhat less than formerly—probably owing to the show being postponed a month and possibly due to the fear of contagious disease. The quality, however, left nothing to be desired, and the hearts of the breeders were gladdened by the presence of large buyers.

Phillipines—Government	12
Java—Government	140
Brazil ,, ...	320

Report says that for the above alone Rs. 60,000 exchanged hands. I trust that every encouragement may be given to breeders in this locality, and I hope that they will not sell their best cows but keep them for breeding.

47. *Koilpatti show.*—The Zamindar of Ettayapuram held an Agricultural exhibition at which prizes for cattle and ponies were given, but the numbers exhibited were very small and of so many types that it cannot be considered to be at all satisfactory from a breeder's point of view.

V.—Veterinary Assistants.

48. The main duty of Veterinary Assistants consisted in attending outbreaks of cattle disease, in instructing the ryots concerning the utility of preventive inoculation, and in carrying on by means of persuasion the work of inoculation in the villages affected by epidemics. There were 608 outbreaks during the year. The districts that suffered most were South Arcot, Madura, North Arcot, Coimbatore, Tinnevelly and Chingleput to each of which a Veterinary Assistant was permanently posted. Other districts, particularly Tanjore, Salem, Malabar, the Nilgiris, Guntúr and Cuddapah, submitted direct reports of outbreaks, when veterinary aid was at once despatched. The difficulties which this department had at first to contend with were

very considerable, and it was with the greatest caution that we had to proceed using infinite tact. As this is the last annual report which I shall write, I take this opportunity of stating that the present success of the inoculation operations is mainly owing to the tact displayed by Veterinary Inspector V. P. Subrahmania Mudaliar and Mr. Sampath Aiyangar, now second lecturer in the Madras Veterinary College, who carried out the first inoculations.

49. During the year there was only one Veterinary Inspector working in the whole Presidency.

(1) Veterinary Inspector V. P. Subrahmania Mudaliar in addition to his work of inspection inoculated against attacks of rinderpest 220 cattle of the Corporation of Madras, attended the cattle fair at Sivalaperi, and the cattle shows held at Berhampur, Párvatípuram, Pithápuram, Ellore, Tiruppúr and Madura. He also delivered in English a very interesting and instructive lecture on the improvement of local cattle at the Berhampur cattle show.

(2) Senior Veterinary Assistant M. Hassen Ali Sahib, whose services had been lent to the Corporation of Madras, was relieved on 8th March 1909, when he rejoined his work in the Civil Veterinary Department. He has since been promoted to the post of Veterinary Inspector, and he attended cattle shows held at Koilpatti in the Tinnevelly district and Ellore in the Kistna district.

(3) Veterinary Assistant S. C. Jeyasing Raj assisted Mr. D. Aitchison, I.C.V.D., in carrying out rinderpest experiments in Kodaikánal for three months, from May to July. He was placed in temporary charge of Veterinary Hospitals at Bellary and Coimbatore during the absence of the permanent incumbents on privilege and casual leave. He inoculated 930 cattle and 58 sheep in Bellary, Anantapur, Salem, Coimbatore and Malabar. He was on privilege leave for one month.

(4) Veterinary Assistant M. P. Kanniah Nayudu assisted Mr. Aitchison, I.C.V.D., for three months on the Kodaikánal Hills in carrying out the rinderpest experiments and spent one month in medically attending No. 27 stallion "Samawy" at Vedasandur. He took leave for two months on loss of pay. He inoculated 4,503 head of cattle against rinderpest.

(5) Veterinary Assistant A. Rajappa worked in North Arcot, Anantapur, Kistna, Gódávari and Ganjám districts. He inoculated 2,522 head of cattle against rinderpest, treated the Government elephants for about five months and attended the cattle show held at Berhampur.

(6) Veterinary Assistant W. A. Douglas was attached to the Madras Veterinary Hospital for seven months and was in charge of the Cocanada Veterinary Hospital for the remainder of the year. He inoculated 1,075 head of contact cattle against rinderpest both in the city of Madras and in the district of Gódávari. He took no leave during the year.

(7) Veterinary Assistant V. Aiyaswami Pillai was on inoculation duty in the districts of Madura, Salem and Tinnevelly and attended cattle fairs at Timmarajapuram, Kazhugamalai and Tiruchendur in the Tinnevelly district. He inoculated 5,145 animals against rinderpest and treated 27 sick animals. He had no leave during the year.

(8) Veterinary Assistant William J. D'Costa was working at the Veterinary Hospital, Madras, for seven months. He inoculated 836 head of cattle against rinderpest in the districts of Trichinopoly, Coimbatore, Malabar and Chingleput. He castrated two ponies and treated 200 sick patients. He availed himself of one month's privilege leave.

(9) Veterinary Assistant K. Doraisawmy Nayudu inoculated 5,287 head of cattle in Bellary, Guntúr and Nellore districts. He also treated 219 animals suffering from wounds, worm in the eye, fever, colic and tumours and castrated one pony. He has taken no leave.

(10) Veterinary Assistant P. Velayudha Mudaliyar worked in Bellary, Vizagapatam, Chingleput, Salem and Madura districts and inoculated in all 1,230 animals against rinderpest. He also assisted Mr. D. Aitchison, I.C.V.D., in conducting rinderpest experiments at Kodaikánal. He took privilege leave for one month.

(11) Veterinary Assistant P. Veerabhadrudu inoculated 2,005 cattle against rinderpest in the districts of Gánjam, Cuddapah, Guntúr, Coimbatore, South Arcot and the Nilgiris. He was on sick leave for $1\frac{1}{2}$ months, and on leave without allowances for two months.

(12) Veterinary Assistant A. Ramachendra Aiyar worked in Chingleput, Kurnool, Coimbatore, Malabar, Trichinopoly, North Arcot, South Arcot and South Canara, and inoculated 3,385 cattle against rinderpest. He treated 317 sick animals. He took leave on loss of pay for one month.

(13) Veterinary Assistant M. Abdul Gaffur inoculated in the Chingleput district 1,177 cattle against anthrax, 1,176 cattle against rinderpest and in Madura district 507 cattle against rinderpest, making up a total of 2,860 head of cattle. He was subsequently placed in charge of Ellore Veterinary Hospital.

(14) Veterinary Assistant A. Ramalinga Mudaliyar was on inoculation duty for about two months in the beginning of the official year and inoculated 1,110 head of cattle against rinderpest in Tanjore and Tinnevelly districts. He was then ordered to take charge of Vellore Hospital and act for V. G. Narasimha Chari, who went on leave on medical certificate.

(15) Veterinary Assistant C. Brown worked in South Arcot, Tanjore, Salem, North Arcot and Coimbatore districts, and inoculated 3,056 animals against rinderpest. He was placed in charge of the Rajahmundry Veterinary Hospital from 5th October 1908.

(16) Veterinary Assistant S. Sankaramurthia Pillai inoculated 243 animals belonging to the Corporation of Madras, attended the Ellore cattle show, assisted the Resident Surgeon in the Madras Veterinary College Hospital for a period of two months. He also rendered valuable assistance to Mr. D. Aitchison, I.C.V.D., in carrying out rinderpest experiments to Kodaikánal, and treated the Government stallions at Kollegal and Kangayam which were then reported to be sick. He was then appointed to take charge of the Veterinary Hospital at Vizianagram.

(17) Veterinary Assistant S. Kesavulu Nayudu inoculated 3,378 head of cattle against rinderpest in Guntúr, the Nilgiris, Coimbatore and Chingleput districts. He was on leave on loss of pay for three months.

The following Veterinary Assistants having qualified for the College diploma in December 1908 were entertained in the Madras Civil Veterinary Department from January 1909 :—

(18) Veterinary Assistant V. M. Subbarama Aiyar inoculated 1,249 cattle against rinderpest in North Arcot district.

(19) Veterinary Assistant A. Castelino inoculated 83 cattle and treated four equines, seventeen bovines, and four dogs in South Canara district.

(20) Veterinary Assistant K. S. Natesa Aiyar inoculated 301 animals against rinderpest in Kurnool district.

(21) Veterinary Assistant M. Hussain Hazari worked in Chingleput district and inoculated 492 animals for rinderpest.

(22) Veterinary Assistant K. Seshagiri Rao attended the cattle show held at Ongole and inoculated in Guntúr district 469 head of cattle and treated seven cattle for other diseases.

(23) Veterinary Assistant T. S. Alagappa Pillai worked in Tanjore and Tinnevelly districts and inoculated 1,889 cattle.

(24) Veterinary Assistant S. S Theetharappa Mudaliyar inoculated 595 cattle against rinderpest in the Tinnevelly district. He treated two cases of rinderpest successfully.

(25) Veterinary Assistant P. Chidambara Nadar worked in the Trichinopoly and Coimbatore districts and inoculated 401 cattle for rinderpest.

(26) Veterinary Assistant V. R. Sangameswara Sastri inoculated 600 cattle in Trichinopoly and South Arcot districts.

(27) Veterinary Assistant C. Suryanarayanamurthi inoculated 640 cattle for rinderpest, and treated four cattle suffering from black quarter and thirteen suffering from rinderpest.

(28) Veterinary Assistant C. Venkatarathnam Chetti worked in Cuddapah district and inoculated 400 cattle against rinderpest.

(29) Veterinary Assistant M. James inoculated 138 head of cattle on the Nilgiris against rinderpest.

(30) Veterinary Assistant M. Thandeswara Aiyar attended the cattle fair at Melmalayanur in South Arcot district and treated nine animals. He was on leave on loss of pay for 14 days, inspected the mares covered by Government stallions stationed in the Madura district, and reported the results of coverings.

(31) Veterinary Assistant A. L. N. Somayajulu worked in Vizagapatam district and inoculated 334 cattle against rinderpest.

(32) Veterinary Assistant M. Audimula Mudaliar attended outbreaks of rinderpest, anthrax, and foot and mouth disease in the Chingleput district.

(33) Veterinary Assistant K. R. Krishna Aiyar worked in the Trichinopoly district and attended outbreaks.

(34) Veterinary Assistant V. Krishnamurthi inoculated 340 head of cattle belonging to the Corporation of Madras.

50. Ninety-two thousand doses of rinderpest serum were received from the Imperial Bacteriologist during the year.

W. D. GUNN, Lt.-Col.,
Superintendent, Civil Veterinary Department.

TABLE I.—Abstract showing main results of Veterinary Colleges and Schools during the year 1908–1909.

Veterinary College and Schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the Collegiate year 1908.		Passed final examination in December 1908.	Failed to pass final examination in December 1908.	Remaining under instruction at the end of the year 1908.				
		Scholarship holders.	Others.			In ordinary course.	Instruction prolonged by reason of failure.	Matriculated with higher qualifications.	Knowing English but not matriculated.	Knowing very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary College, Madras.	..	10	16	24	5	61	5	7	19	..

Veterinary College and Schools.	Receipts.			Expenditure.			Employment of students passed out during three years preceding.				
	From fees.	From other sources.	Total.	Salaries of instructing staff.	Other expenses.	Total.	Total number passed.	In the service of local bodies or Government.	In the service of other bodies.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
	RS. A. P.		RS. A. P.	RS. A. P.	RS.	RS. A. P.					
Veterinary College, Madras.	11,462 12 2	..	11,462 12 2	7,452 2 10	3,410 (stipends).	10,862 2 10	53	40	9	..	* 4

* One Minor Zamindar of Sivagiri and three died.

TABLE II.—Showing number of deaths from contagious diseases amongst animals during the year 1908–1909.

Province.	Equines.						Bovines.			
	Glanders.	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest.	Foot and mouth disease.	Hæmorrhagic Septicæmia.	Black quarter.
1	2	3	4	5	6	7	8	9	10	11
Madras Presidency ..	2	* 18	1	1	47	69	149,666	4,578	..	4,708

Province.	Bovines—*cont.*			Others.						
	Anthrax.	Other contagious diseases.	Total.	Rabies.	Plague.	Hæmorrhagic Septicæmia.	Gillar.	Anthrax.	Other contagious diseases.	Total.
	12	13	14	15	16	17	18	19	20	21
Madras Presidency ..	12,511	44,988	216,451	15	1	..	..	..	138	154

* Includes two cases in Madras Veterinary Hospital.

TABLE III.—Statement showing results of preventive inoculation during the year 1908–1909.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Ganjám	"Rinderpest."	By serum alone.	..	..	..	..	..	..	..	..	..	..
2. Vizagapatam			3	..	39	..	..	331	..	..	..	..
3. Gódávari			6	..	154	..	..	792	..	..	..	..
4. Kistna			2	..	97	..	..	338	..	..	..	..
5. Guntúr			12	..	534	..	..	1,716	197	..	..	..
6. Nellore			15	..	849	15	..	2,076	1,079	..	..	..
7. Chingleput			66	..	1,726	..	..	4,047	695	..	1	..
8. Madras			9	..	8	..	..	2,009	..	..	..	..
9. South Arcot			36	..	1,419	9	..	1,706	66	..	..	..
10. North Arcot			69	..	1,721	..	..	3,150	147	..	1	..
11. Salem			21	..	184	..	..	1,575	..	..	..	..
12. Coimbatore			43	..	678	..	..	4,114	12	..	5	..
13. Trichinopoly			13	..	421	..	..	661	..	..	4	..
14. Tanjore			32	..	683	..	..	3,734	..	..	2	..
15. Madura			52	..	3,683	..	..	6,229	..	..	4	..
16. Tinnevelly			43	..	1,815	..	..	6,188	..	..	..	..
17. Nilgiris			13	..	693	..	..	578	..	..	..	..
18. Bellary			11	..	804	..	..	753	..	..	..	..
19. Anantapur			52	..	1,360	..	..	2,726	30	..	1	..
20. Cuddapah			24	..	501	56	..	2,595	4	..	9	..
21. Kurnool			5	..	96	..	..	1,239	..	..	..	..
22. Malabar			44	..	1,531	..	..	1,617	..	..	37	..
23. South Canara ..			3	..	..	..	..	83	..	..	..	..
Total ..	..	..	574	..	18,996	80	..	48,257	2,230	..	64	..

Table III.—Statement showing results of preventive inoculation during the year 1908–1909—*cont.*

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Nellore	Anthrax.	By serum alone.	14	..	274	..	..	904	..	..	..	..
2. Chingleput			10	..	142	..	..	922	..	..	..	..
3. Coimbatore			1	..	..	..	..	58	..	..	..	..
4. Tanjore			1	..	6	..	..	112	..	..	..	..
5. Bellary			3	..	34	..	..	357	..	..	..	..
		Total ..	29	..	456	..	..	2,353	..	..	..	..
6. Guntúr	Hæmorrhægic Septicæmia.	By serum alone.	3	..	47	..	..	412	..	..	..	..
7. Madura			2	..	..	..	..	65	..	..	..	..
		Total ..	5	..	47	..	..	477	..	..	..	..

TABLE IV.—Statement showing the number of animals treated and castrated by Veterinary Assistants and by Salustries on tour during the year 1908–1909.

Province.	Number of villages visited.	Number of veterinary assistants or salustries employed.	Castrations performed.				Treated for contagious diseases.				Treated for non-contagious diseases.				Total number of cases treated and castrations performed.
			Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Madras — By Veterinary Assistants.	..	28	8	2	..	10	..	..	..	..	..	..	..	..	10
By salustries ..	..	3	34	262	..	296	..	..	..	..	..	..	..	..	296
Total ..	..	31	42	264	..	306	..	..		..	..	..	..	..	306

TABLE V.—Statement showing the number of animals treated at Veterinary Hospitals during 1908–1909.

Province.	Number of veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients. Remaining on 1st April 1908. Equines.	Bovines.	Others.	Admitted during the year. Equines.	Bovines.	Others.	Total. Equines.	Bovines.	Others.	Discharged during the year. Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Madras ..	1	5	25	22	125	600	269	457	625	291	582	599	259	569
Saidapet ..	1	1	7	1	5	78	22	77	85	23	82	81	23	71
Vellore ..	1	1	6	..	..	49	44	17	55	44	17	50	35	16
Madura ..	1	1	7	3	1	59	25	13	66	28	14	61	27	14
Trichinopoly ..	1	1	12	15	5	301	396	254	313	411	259	308	394	257
Coimbatore ..	1	1	10	4	5	..	..	..	10	4	5	10	4	5
Vizianagram ..	1	1	3	..	..	85	15	3	88	15	3	84	15	3
Vizagapatam ..	1	1	..	..	3	37	29	57	37	29	60	34	25	58
Pithápuram ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Bellary ..	1	1	4	11	4	100	218	110	104	229	114	100	225	112
Rajamundry ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Cocanada ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Ellore	1	1	..	..		..	..	..	..	..	..	..	..	..
Tiruvannámalai.	1	1	..	..	..	1	6	3	1	6	3	1	6	3
Tanjore ..	1	1	..	..	..	4	5	6	4	5	6	4	3	6
Pudukkóttai ..	1	1	Not furnished.											
Trichur ..	1	1	Do.											
Total ..	17	21	74	56	148	1,314	1,029	997	1,388	1,085	1,145	1,332	1,016	1,114

Province.	In-patients—*cont.* Balance on 31st March 1909. Equines.	Bovines	Others.	Out-patients. Number treated during the year. Equines.	Bovines.	Others.	Average daily attendance. Equines.	Bovines.	Others.	Total number of in- and out-patients treated during the year. Equines.	Bovines.	Others.	Total.	Receipts. RS. A. P.	Expenditure. RS. A. P.
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Madras ..	26	32	13	318	145	912	7·00	3·00	14·00	943	436	1,494	2,873	11,462 12 2	29,237 7 8
Saidapet ..	4	..	11	200	475	226	6·46	11·10	6·38	285	498	308	1,091	566 2 3	969 9 7
Vellore ..	5	9	1	183	181	243	10·90	7·40	6·10	238	225	260	723	120 0 0	1,279 9 4
Madura ..	5	1	..	221	470	125	10·38	14·54	2·90	287	498	139	924	58 2 0	1,774 4 2
Trichinopoly ..	5	17	2	4,001	8,381	1,230	11·00	24·00	3·00	4,314	8,792	1,489	14,595	838 14 0	.. .
Coimbatore ..	..	..	.	2,920	3,876	1,426	8·00	10·61	3·90	2,930	3,880	1,431	8,241	1,500 0 0	1,160 8 0
Vizianagram ..	4	..	..	218	86	123	12·00	1·00	4·00	306	101	126	533	1,494 12 0	1,144 15 11
Vizagapatam ..	3	4	2	179	156	324	7·70	5·00	9·50	216	185	384	785	1,736 5 6	2,269 0 4
Pithápuram ..	..	..	..	243	431	578	7·34	8·68	9·37	243	431	578	1,252	..	2,120 0 0
Bellary ..	4	4	2	440	844	464	..	..	..	544	1,073	578	2,195	4,182 9 10	4,182 9 10
Rajamundry ..	..	..	..	16	100	78	1·30	9·60	5·90	16	100	78	194	..	277 4 10
Cocanada ..	..	..	..	89	277	258	10·30			89	277	258	624	3,000 0 0	1,624 0 0
Ellore ..	..	..	..	102	887	46	1·00	8·00	..	102	887	46	1,035	13 8 1	194 10 6
Tiruvannámalai.	..	..	..	8	59	20	0·70	7·60	2·20	9	65	23	97	1,400 0 0	384 1 7
Tanjore ..	..	2	..	11	32	14	0·03	0·09	0·04	15	37	20	72	231 5 4	235 13 4
Pudukkóttai ..	Not furnished.														
Trichur ..	Do.														
Total ..	56	69	31	9,149	16,400	6,067	6·45	8·50	5·61	10537	17,485	7,212	35,234	26,604 7 2	46,853 15 1

TABLE VI.—Abstract showing receipts and expenditure of Veterinary Dispensaries during 1908–1909.

Province.	Receipts.						
	Last year's balance.	By local fund grants.	By Government grants.	By municipal contributions.	By fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1. Madras	—7,811 11 9	..	..	..	11,462 12 2	..	11,462 12 2
2. Saidapet	1,202 7 0	..	..	..	485 5 9	80 12 6	566 2 3
3. Vellore	— 814 11 1	..	120 0 0	..	..	..	120 0 0
4. Madura	Not reported.	..	..	..	58 2 0	..	58 2 0
5. Trichinopoly	Do.	Details not furnished.					* 838 14 0
6. Coimbatore	Do.	1,300 0 0	..	100 0 0	..	100 0 0	1,500 0 0
7. Vizianagram	839 3 7	1,494 12 0	..	..	..	..	1,494 12 0
8. Vizagapatam	952 12 5	1,660 0 0	..	..	76 5 6	..	1,736 5 6
9. Pithápuram	Not reported.	..	..	..	..	..	..
10. Bellary	Do.	1,747 15 4	360 0 0	..	359 1 9	1,715 8 9	4,182 9 10
11. Pudukkóttai	Do.	Information not available.					
12. Rajahmundry	Do.	..	..	..	..	..	..
13. Cocanada	Do.	3,000 0 0	..	..	..	..	3,000 0 0
14. Ellore	Do.	..	..	..	..	13 8 1	13 8 1
15. Tiruvannámalai ..	Do.	1,400 0 0	..	..	..	..	1,400 0 0
16. Tanjore	Do.	231 5 4	..	..	..	..	231 5 4
17. Trichur	Do.	..	Information not available.				
Total ..	..	10,834 0 8	480 0 0	100 0 0	12,441 11 2	1,909 13 4	26,604 7 2
		* 838 14 0					

Province.	Expenditure.						Balance.
	Pay.	Travelling allowance.	Medicine and instruments.	Furniture.	Contingencies.	Total.	
	9	10	11	12	13	14	15
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1. Madras	12,699 15 8	..	591 9 0	734 10 8	15,211 4 4	29,237 7 8	—25,586 7 3
2. Saidapet	894 0 0	..	..	..	75 9 7	969 9 7	798 15 8
3. Vellore	1,091 0 4	31 0 0	56 8 0	..	101 1 0	1,279 9 4	—1,974 4 5
4. Madura	1,068 9 11	..	309 11 3	..	395 15 0	1,774 4 2	—1,716 2 2
5. Trichinopoly	..	Not reported.					
6. Coimbatore	740 13 11	..	..	140 9 0	279 1 1	1,160 8 0	339 8 0
7. Vizianagram	801 14 2	53 6 0	231 10 0	..	58 1 9	1,144 15 11	1,188 15 8
8. Vizagapatam	1,156 10 11	36 2 0	845 10 6	..	230 8 11	2,269 0 4	420 1 7
9. Pithápuram	1,100 0 0	340 0 0	500 0 0	..	180 0 0	2,120 0 0	..
10. Bellary	1,711 6 11	..	1,046 8 7	†1,034 4 7	390 5 9	4,182 9 10	..
11. Pudukkóttai	..	Information not available.					
12. Rajahmundry	239 3 7	17 2 0	..	..	20 15 3	277 4 10	..
13. Cocanada	964 0 0	99 0 0	80 0 0	..	‡ 481 0 0	1,624 0 0	1,376 0 0
14. Ellore	129 13 5	14 4 0	..	..	50 9 1	194 10 6	— 181 2 5
15. Tiruvannámalai ..	143 13 11	13 14 0	60 13 0	144 8 0	21 0 8	384 1 7	1,015 14 5
16. Tanjore	222 1 11	4 8 0	..	..	9 3 5	235 13 4	— 4 8 0
17. Trichur	..	Information not available.					
Total ..	22,963 8 8	609 4 0	3,722 6 4	2,054 0 3	17,504 11 10	46,853 15 1	..

* The details for this amount have not been furnished.

† This amount was spent for building construction.

‡ Including furniture also.

TABLE VII.—Statement showing strength of subordinate Veterinary staff employed during the year 1908–1909.

Province.	How occupied.	Whether paid from Provincial or from Local funds.	Veterinary Inspector.	Veterinary Assistant.	Subordinate teaching staff.	Remarks.
1	2	3	4	5	6	7
Madras ..	Itinerating and attending cattle fairs and shows.	Provincial ..	2	* 28	..	* No. 28 includes two Veterinary Assistants who resigned.
		Local Funds and Provincial.	..	† 13	..	† 13 includes—one Veterinary Assistant in charge of the building of the Ongole hospital which was started in April 1909 and four Veterinary Assistants having no lien on Government Service.
	In charge of hospitals.	Rajas ..	..	‡ 4	..	‡ Four includes—one Veterinary Assistant having no lien on Government service.
		Society for the Prevention of Cruelty to Animals, Bellary.	..	§ 1	..	§ Having no lien on Government service.
	In charge of quarantine depot.	Foreign (Ceylon) Government.	..	1	..	
	College work ..	Provincial ..	..	..	4	One Assistant Principal and three Lecturers.
		Total ..	2	47	4	

NOTE.—Six Veterinary Assistants at Cocanada, Bellary, Trichinopoly, Tanjore, Madura and Trichur have no lien on Government service.

TABLE VIII.—Return of stud bulls for the year 1908–1909.

Province.	Property of Government.					Property of local bodies.				
	Number on 1st April 1908.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1909.	Number on 1st April 1908.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1909.
		No.	Average price paid.				No.	Average price paid.		
1	2	3	4	5	6	7	8	9	10	11
Madras	19	..	..	1	* 18	..	..	..	..	..

* The bulls are posted thus—Two in Vizagapatam, eleven in Guntúr, two at the Madras Veterinary College, one in Madura, and two in Tinnevelly district.

TABLE IX.—Statement showing main results of the working of provincial cattle farm during the year 1908-1909—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions, local bodies, for the year 1908-1909.

Details.	Horse and pony stallions under local bodies.												
	Horses.						Ponies.						Total horses and ponies.
	Arab.	Persian.	Thorough-bred English.	Country-bred.	Australian.	Total.	Arab.	Persian.	Country-bred.	Deli.	Shan.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Balance on 31st April 1908	..	..	..	..	..	..	13	..	..	..	..	13	13
Increase. By transfer.	..	..	..	..	..	..	..	..	..	..	..	..	..
Increase. Purchased in India.	..	..	..	..	..	..	..	..	..	..	..	..	..
Increase. Received from Europe by purchase.	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	13	..	..	..	..	13	13
Decrease. Died ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Decrease. Sold	..	..	..	..	..	..	..	..	..	..	..	..	..
Decrease. Destroyed ..	..	..	..	..	..	..	1	..	..	..	..	1	1
Decrease. Transferred to.	..	..	..	..	..	..	..	..	..	..	..	..	..
Total decrease ..	..	..	..	..	..	..	1	..	..	..	..	1	1

Details.	Donkey stallions under local bodies.								
	Italian.	Cyprian.	Country-bred (Punjabi).	Persian.	Catalonian.	Arab.	American.	Sicilian.	Total.
	15	16	17	18	19	20	21	22	23
Balance on 1st April 1908.	..	..	..	..	..	..	..	..	..
Increase. By transfer.	..	..	..	..	..	..	..	..	..
Increase. Purchased in India.	..	..	..	..	..	..	..	..	..
Increase. Received from Europe by purchase.	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	..	..	..
Decrease. Died ..	..	..	..	..	..	..	..	..	..
Decrease. Sold ..	..	..	..	..	..	..	..	..	..
Decrease. Destroyed ..	..	..	..	..	..	..	..	..	..
Decrease. Transferred to.	..	..	..	..	..	..	..	..	..
Total decrease ..	..	..	..	..	..	..	..	..	..

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions under local bodies during the year 1908–1909.

Horse, pony or donkey.	Province.	Stallions on register on 31st March 1909.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
Pony . ..	Madras ..	12	13	14	239	284	17·5	21	One of the stallions No. 17 "Hector" was destroyed in December 1908.

N.B.—The stallions at stud are under the Provincial Department of Government.

TABLE XII.—Average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1908–1909.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	RS. A. P. 397 9 7	RS. A. P. 280 10 0	..	..	The total expenditure for upkeep alone of 12 Government stallions for the whole year and one for eight months amounted to Rs. 5,036-4-2.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year 1908–1909—*Nil.*

TABLE XIV.—Abstract of particulars regarding cattle fairs and shows held during the year 1908–1909.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animals sold.				
		Bulls	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cattle Fairs.													
Sivalaperi	1	..	14,000	100	..	30	..	870	..	..	..	..	..
Kanniseri	1	..	12,000	200	200	600	..	..	..	..	..	..	..
Thimmarajapuram ..	1	..	3,250	35	125	65	..	..	..	..	..	..	..
Tiruchendur	1	..	7,300	65	500	125	..	10	..	..	..	..	..
Kazhugumalai	1	..	19,000	60	600	330	..	15	..	..	..	..	..
Subramania	1	..	559	..	..	114	..	..	..	..	..	..	..
Melmalayanur	1	..	7,000	Not available.									
Cattle Shows.													
Madura	1	118	370	26	10	9	..	39	..	..	..	..	..
Tiruppúr	1	456	..	..	..	4	..	23 and 220 ponies.	..	..	..	..	..
Ellore	1	31	83	150	9	53	..	64	..	..	..	..	..
Berhampúr	1	9	282	38	17	153	..	38	..	..	..	..	..
Parvatipuram	1	29	254	41	27	160	..	6	..	..	..	..	..
Pittapuram	1	29	147	57	44	39	..	26	..	..	..	..	..
Ongole	1	127	29	231	119	46	..	57	..	..	..	..	..
Total ..	14	799	64,274	1,003	1,651	1,728	..	1,368	..	..	..	..	..

—	Amount realised in fees.	Total number of animals that competed for prizes.	Prizes awarded.						Number of medals.
			From Imperial funds.	From Provincial funds.	From local bodies.	From other sources.	Total.	Amount actually awarded.	
	15	16	17	18	19	20	21	22	23
Cattle Fairs.	RS. A. P.	RS.	RS.	RS.	RS. A.	RS. A. P.	RS. A. P.	RS. A. P.	
Sivalaperi	..	15,000	..	..	..	..	..	..	..
Kanniseri	..	13,000	..	..	..	..	..	..	..
Thimmarajapuram ..	..	3,475	..	..	..	..	..	..	..
Tiruchendur (*a*)	..	8,000	..	..	..	..	..	..	..
Kazhugumalai	..	20,005	..	..	..	..	..	..	..
Subramania	..	673	..	..	..	..	..	..	..
Melmalayanur	..	7,000	..	..	..	..	..	..	..
Cattle Shows.									
Madura (*b*)	..	572	..	300	500 0	50 0 0	850 0 0	319 0 0	2
Tiruppúr (*c*)	..	703	Figures not reported.					1,078 0 0	2
Ellore (*d*)	..	390	..	500	475 0	3,433 12 3	4,408 12 3	918 4 0	..
Berhampur (*e*)	248 10 6	537	..	500	250 0	2,338 1 3	3,088 1 3	605 0 0	5
Parvatipuram (*f*)	..	517	..	500	1,050 0	150 0 0	1,700 0 0	1,033 0 0	9
Pittapuram (*g*)	..	342	..	500	706 0	600 0 0	1,806 0 0	706 0 0	4
Ongole (*h*)	..	609	..	1,500	1,185 0	1,102 0 0	3,787 0 0	2,450 0 0	2
Total ..	248 10 6	70,823	..	3,800	4,166 0	7,673 13 6	15,639 13 6	7,109 4 0	24

REMARKS.—(*a*) One Venkatachalam Chetty was prosecuted under the Act.

(*b*) Gold medals worth Rs. 60.

(*c*) Two Silver medals by Government.

(*d*) Total includes opening balance of Rs. 1,917-13-9.

(*e*) All silver medals.

(*f*) Two German Silver, two Gold and five Silver medals by 3 others.

(*g*) Two Silver medals, two Gold medals and 1 Silver cup.

(*h*) Government medals.

TABLE XIV (*a*).—Statement showing the cost of the Civil Veterinary Department in the Province of Madras during the financial year 1908–1909.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
1	2	3	4	5
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Superintendence	28,423 8 0	* 15,639 6 4	..	44,062 14 4
Veterinary instruction	..	29,237 7 8	..	29,237 7 8
Subordinate establishment	..	13,805 13 11	..	13,805 13 11
Hospitals and dispensaries	..	2,633 10 9	..	2,633 10 9
Breeding operations	..	5,036 4 2	..	5,036 4 2
Prizes	..	4,805 0 0	..	4,805 0 0
Fairs and shows	..	..	3,764 0 0	3,764 0 0
Total ..	28,423 8 0	71,157 10 10	3,764 0 0	1,03,345 2 10

* Includes Rs. 2,314–10–9, the cost of rinderpest experiments.

TABLE XV.—Comparative statement of cattle mortality for five years ending 1908–1909.

Causes of death.	Number of deaths among cattle for the year ending				
	1904–1905.	1905–1906.	1906–1907.	1907–1908.	1908–1909.
Diseases.					
Rinderpest	19,772	19,050	31,611	97,244	149,666
Anthrax	14,996	13,474	12,082	10,977	12,511
Malignant sore-throat	11,317	8,838	9,086	7,190	6,888
Black quarter	7,683	5,952	4,168	6,148	4,708
Epizootic aphtha	2,767	4,074	2,794	3,544	4,578
Others	33,336	38,905	53,798	27,731	38,100
Total ..	89,871	90,293	113,539	152,834	216,451
Other causes.					
Snake bite	2,257	2,011	1,899	1,885	1,625
Wild animals	12,061	13,232	13,372	12,611	11,412
Criminal poisoning	52	58	43	56	26
Total ..	14,370	15,301	15,314	14,552	13,063
Grand total ..	104,241	105,594	128,853	167,386	229,514

TABLE XVI.—Statistics of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during the year 1908–1909.

Districts.	Number of deaths among Cattle — From diseases. Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám	3,441	..	673	531	199	290	1,455	6,589	44	162	3
2. Vizagapatam	668	..	377	144	166	139	294	1,788	40	92	2
3. Gódávari	763	..	1,210	410	195	56	2,154	4,788	83	250	..
4. Kistna	1,410	..	1,168	888	252	307	1,843	5,868	201	44	3
5. Guntúr	1,334	..	130	674	316	10	219	2,683	2	1	..
6. Kurnool	1,524	..	672	271	329	95	3,485	6,376	82	385	2
7. Bellary	2,507	..	465	220	494	83	3,037	6,806	20	190	..
8. Anantapúr	8,697	..	434	235	581	170	3,469	13,586	28	330	5
9. Cuddapah	4,815	..	588	229	300	97	3,840	9,869	33	516	..
10. Nellore	2,577	..	1,488	1,235	246	101	1,873	7,520	149	80	3
11. Chingleput	10,242	..	558	306	156	198	733	12,193	110	7	..
12. South Arcot	23,893	..	791	155	139	234	2,392	27,104	115	171	..
13. North Arcot	15,695	..	360	153	305	85	1,894	18,492	176	732	1
14. Salem	4,772	..	207	103	253	276	964	6,575	49	296	..
15. Coimbatore	13,519	..	235	180	305	934	2,572	17,745	78	669	1
16. Trichinopoly	2,614	..	375	106	33	479	2,073	5,680	72	86	2
17. Tanjore	4,805	..	605	397	39	80	447	6,373	75	2	..
18. Madura	23,049	..	887	201	344	339	1,703	26,523	134	117	1
19. Tinnevelly	11,715	..	421	75	44	241	2,281	14,777	38	27	..
20. Nilgiris	2,790	..	..	30	..	5	80	2,905	5	273	3
21. Malabar	7,686	..	841	333	1	357	806	10,024	85	2,228	..
22. South Canara	1,650	..	26	12	11	2	486	2,187	6	4,754	..
Total ..	149,666	..	12,511	6,888	4,708	4,578	38,100	216,451	1,625	11,412	26

Districts.	Number of deaths among—*cont.* Cattle—*cont.* Total.	Grand total.	Total stock by the latest census.	Horses and ponies. From diseases. Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.
13	14	15	16	17	18	19	20	21	22	23	24
1. Ganjám	209	6,798	..	..	..	2	2	..	..	..	..	2
2. Vizagapatam	134	1,922	..	..	1	..	1	..	..	..	..	1
3. Gódávari	333	5,121	..	..	1	15	16	1	2	..	3	19
4. Kistna	248	6,116	..	..	1	15	16	2	1	..	3	19
5. Guntúr	3	2,686	..	..	..	..	..	..	..	..	..	..
6. Kurnool	469	6,845	..	3	1	25	29	..	8	..	8	37
7. Bellary	210	7,016	..	3	3	32	38	..	12	..	12	50
8. Anantapur	363	13,949	..	6	1	22	29	2	15	..	17	46
9. Cuddapah	549	10,418	..	3	1	3	7	..	2	..	2	9
10. Nellore	232	7,752	..	12	..	7	19	1	1	..	2	21
11. Chingleput	117	12,310	..	..	..	..	..	..	..	..	..	..
12. South Arcot	286	27,390	..	..	..	1	1	..	..	..	..	1
13. North Arcot	909	19,401	..	..	1	9	10	..	1	..	1	11
14. Salem	345	6,920	..	..	1	..	1	..	2	..	2	3
15. Coimbatore	748	18,493	..	33	1	16	50	..	9	..	9	59
16. Trichinopoly	160	5,840	..	..	..	6	6	..	..	..	..	6
17. Tanjore	77	6,450	..	..	..	2	2	..	..	..	..	2
18. Madura	252	26,775	..	10	2	11	23	4	45	..	49	72
19. Tinnevelly	65	14,842	..	1	2	19	22	..	..	..	..	22
20. Nilgiris	281	3,186	..	12	..	4	16	..	6	..	6	22
21. Malabar	2,313	12,337	..	..	..	..	..	..	5	..	5	5
22. South Canara	4,760	6,947	..	..	..	..	..	..	..	..	..	..
Total ..	13,063	229,514	..	83	16	189	288	10	109	..	119	407

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., Sur., L. Rds. and Agri.), No. 271, dated 31st July 1909.

The Hon'ble Mr. A. E. CASTLESTUART STUART.

The reports of the Director of Agriculture and the Superintendent, Civil Veterinary Department, on the operations of their respective departments for the year 1908–1909 will be submitted to Government.

2. *Agricultural stations.*—No new agricultural stations were opened during the year but the farm at Bezwada which was originally under the charge of the District Board of Kistna was, under the orders conveyed in G.O., No. 1256, dated 5th May 1908, taken over by the Agricultural Department while the farm at Attur was abandoned. The number of agricultural stations looked after by the department was accordingly ten at the end of the year. The season at the Central Agricultural station, Coimbatore, was unfavourable for agricultural operations, but at the remaining stations useful experimental and demonstration work was carried on during the year and the work turned out was on the whole satisfactory.

Cotton.—Experiments towards improving the cultivation of cotton were continued at Nandyal, Koilpatti and at Hagari. The Board notes that by a careful process of seed selection at the Nandyal farm, the standard of the cotton crop is being raised and it shares the hope expressed by Mr. Wood that, as a result of this process of selection as well as of work on mendelian lines which is being carried on at Coimbatore by the Government Botanist, a strain of cotton superior to the existing varieties from both the buyers' and growers' points of view and yielding a higher percentage of lint may be evolved in the near future. At Tinnevelly, the superiority of the Karungunni variety over the only other variety of cotton common in the district, *viz.*, Uppam, appears to have been well established. Seed distribution was taken up on a large scale and the effect of the extended distribution of seed by the department will, as observed by the Director of Agriculture, go far to enhance the value of Tinnevelly cotton. The Board notes with pleasure that the seed drill is becoming more and more popular in the Tinnevelly district. As remarked last year, the system of paying a premium of As. 2 per acre to ryots who grew pure cotton does not appear to have met with much success. There has been a steady decline in the areas cultivated with pure crops of cotton, so much so that it has fallen from 1,459 acres in 1907–1908 to 159 in 1908–1909 and the Director of Agriculture has recommended the discontinuance of the payment of premia in future for growing pure cotton. This will be reported upon to Government separately.

Paddy.—The Board is glad to note that there has been a striking increase in the outturn of paddy at Palur and at Taliparamba owing to the seed having been selected from singly planted fields. At Samalkota also the singly planted plots appear to have given the best yields. One of the chief advantages of this system is reported to consist in the rapid improvement which it effects in the quality of the grain. It is satisfactory that both in Tanjore and Tinnevelly the ryots have begun to appreciate the advantages of single planting.

Sugarcane.—The new Mauritius canes introduced into the Gódávari and South Arcot districts are rapidly ousting the inferior local canes hitherto grown. The area under Mauritius canes in the latter district increased from 60 acres in 1907–1908 to 247 acres in 1908–1909, while there were only 130 acres under the local

canes. The Barbados cane, introduced by the Government Botanist on the Samalkota Agricultural station, is stated to be a short sturdy plant, yielding juice of exceptional richness, and the ryots of the neighbourhood are reported to be extremely anxious to have this variety both because of the fine quality of its jaggery and because it requires fewer supports.

Ground-nut.—The ground-nut crop may be said to be fairly well established in Malabar, while its prospects in South Canara are hopeful.

3. *Agricultural instruction.*—The work of the students was, on the whole, satisfactory notwithstanding the incomplete state of the buildings (which were formally opened by His Excellency the Governor on 14th July 1909), and an outbreak of plague in the town which led to the early closing of the College for the summer vacation from 1st March 1909 instead of from 1st April 1909. The Board is glad to observe that the curriculum is so arranged as to combine practical work in the field with theoretical instruction, and that to ensure better results in this direction, the Deputy Directors have been instructed to visit the College at least once a term and report on the results of the practical training of the students.

4. *Agricultural Associations and Exhibitions.*—The Board notes with considerable satisfaction the good work done by the Agricultural Associations in Malabar, South Canara, Tinnevelly, Madura, Kumbakónam and Coimbatore, though most of the other Associations were in a somewhat dormant condition. Agricultural Exhibitions were held at Ongole, Tiruppur, Madura, Kizhur, Berhampur, Pithápuram, Párvátipuram and Ellore by the respective district Agricultural Associations and at Pudukkóttai by the local association. Similar shows held at Trichur under the patronage of the Cochin Darbar and at Arni and Koilpatti under the auspices of the Jaghirdar and the Zamindar respectively are specially worthy of note.

5. The Assistant in Mycology who had been working in connection with the eradication of palm disease in Gódávari was deputed to Pusa for training under the Imperial Mycologist. The operations in Gódávari have proved quite successful and it is satisfactory to learn that the disease has been extirpated completely from two taluks and partially from a third. Dr. Butler's report on the effect of the operations in circumscribing the area of the disease has been submitted to Government. The Board endorses the Director's remark that credit is due to Mr. Green, the Deputy Collector in charge of the operations, for their remarkable success.

6. A third Assistant to the Government Botanist has been appointed for Entomological work and he has been deputed to Pusa for one year's training. The two other Entomological Assistants visited Pusa from 15th to 30th March 1909 and received a training in the rearing of the Eri-silk worm which promises to develop into a useful cottage industry.

7. *Meteorology.*—The rainfall registered at the various rain-gauge stations was tabulated as usual and the results published by the Meteorologist, Madras, and Deputy Director of the Madras Observatory. The total number of stations in the Presidency at the end of the official year 1908–1909 was 476, inclusive of 84 in the Native States, or six more than at the end of the previous year and of these, 391 stations were inspected.

8. *Statistics.*—The following returns were published in connection with local enquiries under provincial direction:—(1) monthly season reports in three sections, rainfall, cultivation, and prices of food-grains and salt; (2) annual crop forecast reports in respect of cotton, paddy, ground-nut, indigo, sugarcane, castors and gingelly and (3) quarterly reports of cattle mortality.

9. *Civil Veterinary Department—The Madras Veterinary College.*—The work of the College continued to be satisfactory and 24 students graduated in the year. In classes A and B, however, the results in some of the subjects were poor. This was due partly to want of efficient teaching in certain subjects which the Board has taken steps to rectify, and partly to the inferior quality of the students in those classes. The Board trusts that, under the management of Mr. Aitchison who assumed charge, as whole-time Principal of the College, on the 1st February 1909, better results will be attained in future. With reference to the Superintendent's remark in paragraph 7 of his report that the poor material referred to in class A is due to want of

sufficient inducement to passed men to seek admission into the College and the consequent enlistment of unpassed men, the Board proposes to address Government separately.

10. *Veterinary dispensaries.*—Six new dispensaries were opened during the year, making a total of 17 dispensaries at work at the close of the year. Of these four, viz., those at Madras, Saidapet, Ellore and Rajahmundry are Government dispensaries, eight are maintained by local boards, one by the Rajah of Vizianagram and three by Zamindars, while the hospital at Bellary is in charge of the Society for the Prevention of Cruelty to Animals. The Board regrets to observe that the attendance at the Madura hospital was worse than in the previous year. At all the other hospitals except that at Saidapet there was an increase in the number of animals treated.

11. *Veterinary Assistants.*—Eighteen Veterinary Assistants were newly appointed during the year out of the 24 candidates that came out successful at the final examination. The work turned out by the practising Veterinary staff was good, 51,087 head of cattle having been inoculated in the year against 38,428 in the preceding year.

12. *Pony-breeding operations.*—The results of these operations during the five years ending 31st March 1908 were reviewed in B.P., No. 175, dated 12th May 1909, disposed of in G.O., No. 1686, dated 24th June 1909. The work of the Government stallions stationed in each of the three districts, *viz.*, Coimbatore, Madura and Salem was less than in the preceding year. The Board expects that under the arrangements since made, better results will be attained in future. The work of castration progressed favourably, the number of animals castrated during the year being only five less than in the preceding year.

13. *Cattle shows.*—Seven cattle shows were held during the year against six in the preceding year. The Board notes with pleasure that these shows are growing in popularity and are becoming potent centres for the dissemination of Veterinary and Agricultural knowledge among the rural population.

14. *Breeding bulls.*—Of the nineteen bulls at work during the year one died. The two bulls stationed at the Madras Veterinary College covered 126 cows during the year. The work of the bulls at the other stations has not been reported on in spite of the remarks made on this subject in last year's review.

(True Extract.)

L. D. SWAMIKANNU,
Secretary.

To the Secretary to Government, Revenue Department.
,, Director of Agriculture.
,, Superintendent, Civil Veterinary Department.
,, Principal, Madras Veterinary College.

Order—No. 2709, Revenue, dated 2nd October 1909.

Miscellaneous.

Recorded.

2. The report embodies the result of the third year's working of the Agricultural Department since its reorganisation. The year was marked by the opening of the new Agricultural College at Coimbatore. The buildings were not completed and formally opened till after the close of the year but special arrangements were made for the teaching of the students and their work was on the whole satisfactory.

3. No new agricultural stations were opened during the year but the farm which was maintained at Bezwada by the District Board of Kistna was taken over by the Agricultural Department. The agricultural station at Attur in the Chingleput district which was opened in 1906 was abandoned, as the soil which is very sandy was found to be unsuited for agricultural operations. The season was favourable at all the existing agricultural stations except at the Central Agricultural Station, Coimbatore, and the experimental and demonstration work carried on at all the stations was satisfactory. The very interesting experiments in the direction of single

seedling transplantation of paddy carried out at the Palur, Taliparamba and Samalkota Agricultural Stations were successful, the result being increased yields and improvement in the quality of grain, besides a great saving in seed. The Government are glad to note that this system is likely to be adopted by the ryots in Tanjore and Tinnevelly. The experiments aptly illustrate the value of scientific investigation even in processes that have resulted from centuries of practical experience. On the other hand experience vindicated itself in two matters tested in the Hagari station, the ryots' aversion to growing paddy in black cotton soil, and to commencing wet cultivation in the autumn months being proved to be well-founded. The Government are also glad to observe that the measures adopted in the Tinnevelly district for the improvement of cotton cultivation have borne fruit and that the process of seed selection at the Nandyal farm has brought within the range of possibility the evolution of a strain of cotton superior to existing varieties. The importance of these efforts to improve the cotton of the country cannot be over-estimated. Though the experiments at the Samalkota and Taliparamba Agricultural stations and in the Tanjore district have demonstrated that Bengal jute cannot be profitably cultivated in this Presidency, it is satisfactory to note that through the Agency of the Agricultural Department new crops are being successfully introduced into tracts where they were hitherto unknown, viz., ground-nut into Malabar and South Canara and Mauritius sugar-canes into Ganjám, Tinnevelly and Malabar. The Government trust that the Barbados cane introduced by the Government Botanist on the Samalkota station will similarly increase in favour. The growing friendly relations of the staffs of the agricultural stations with the neighbouring ryots and the increase in the number of ryots visiting the stations are most satisfactory. The issue by the Department in English, Tamil and Telugu of the Agricultural calendar containing notes and instructions on agricultural improvements and on the work of the department generally is a useful innovation and the Government are glad to observe the interest and enquiry stimulated thereby.

4. The excellent examples set by the Agricultural Associations in Malabar, South Canara, Kumbakónam, Madura, Coimbatore, Tinnevelly and Ganjám in popularising new crops and methods in their districts may well be imitated by the associations in other places also.

5. The Government note with pleasure the testimony borne to the good work done by Mr. Green in connection with the extirpation of the palm disease in the Gódávari district.

6. The Government regret to observe that the standard of teaching in the Madras Veterinary College was not all that could be desired and sufficient endeavours do not appear to have been made to secure the full complement of students in class A. It is, however, hoped that the grant of free-quarters or house-rent in lieu thereof and a local allowance of Rs. 10 per mensem to the Veterinary Assistants holding independent charge of hospitals and dispensaries as also the new arrangements sanctioned in G.O., No. 1618, Revenue, dated 18th June 1909, will ensure a better recruitment in future. His Excellency the Governor in Council trusts that no pains will be spared in making the teaching at the College more efficient and in attracting a larger number and a better class of students. It is needless to point out that the success and the usefulness of the Veterinary Department as a whole depend upon the class of men recruited at the college and the training given therein.

7. During the year under report, six new dispensaries were started and the staff of the Veterinary Department was strengthened by the appointment of 18 new Veterinary Assistants from among the students who graduated in the year. The number of inoculations against contagious diseases shows an appreciable increase, though it is in no way commensurate with the rise in mortality. This is evidently due to the fact that the staff of the Department is not yet complete and a progressive improvement is anticipated as the staff is gradually strengthened. His Excellency the Governor in Council notes with pleasure that preventive inoculation is gaining in popularity and its benefits becoming more widely recognised. The subject is one of the utmost importance to the country, and should engage the unremitting attention of the Superintendent, Civil Veterinary Department.

8. The results of the pony-breeding operations during the five years ending 31st March 1908 are not encouraging ; but this was to some extent due, it is believed, to the inability of the Superintendent, Civil Veterinary Department, to spare sufficient time for personal supervision. In G.O., No. 1686, Revenue, dated 24th June 1909, the Government approved the proposal to continue the operations for a further period of three years and the scheme for carrying them out was also revised. The Government hope that this will lead to better results.

9. The number of cattle-shows has increased by one. The reports received regarding them show that they are steadily growing in popularity in spite of the prejudice of the people against exhibiting well-bred horses and cattle for fear of "evil-eye." The Governor in Council notes with great satisfaction that these shows are becoming potent centres for the dissemination of Veterinary and Agricultural knowledge among the rural population and trusts that every endeavour will be made to foster the interest of the people in these shows, which should, if possible, be made permanent institutions in important centres.

10. The Superintendent, Civil Veterinary Department, should be called upon to report on the work of the Government bulls at the various stations.

(True Extract.)

L. M. WYNOH,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement).
,, Director of Industries.
,, Public Department.
,, Educational Department.
,, Local and Municipal Department.
, Public Works Department (Irrigation).
,, Inspector General of Agriculture.
,, ,, of Civil Veterinary Department.
,, Minister of Agriculture, Argentine Republic.
,, Entomologist to the Government of India.
,, Mycologist to the Government of India.
' Copy to the Government of India, Department of Revenue and Agriculture (C.L.).
Editors' Table.

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1909-1910.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1910

Maximum number of pages prescribed—

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Administrative report of the Agricultural stations	
Report on the College of Agriculture, Coimbatore ..	
Government Botanist's report	4
Madras Agricultural Chemist's report	
Civil Veterinary Department	

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I

REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1909-1910.

I.—STAFF.

During the year under report I was in charge of the office of Director of Agriculture during the whole year, with the exception of the period of two months' privilege leave of which I availed myself from April 14th to June 15th. Satisfactory progress has been made during the year with the organisation of the Department.

2. In G.O., No. 2137, Revenue, dated 4th August 1909, two appointments of Assistant Directors were created, and M.R.Ry. D. Ananda Rao, B.Sc., was appointed to one of them in G.O., No. 2919, Revenue, dated 22nd October 1909, on one year's probation. His head-quarters have been fixed at Samalkota. Mr. R. D. Anstead, the newly appointed Scientific Officer to the United Planters' Association of Southern India, joined his post on 12th May 1909. He has been recruited as a Member of the Indian Agricultural Service for five years, and placed at the disposal of the United Planters' Association of Southern India in regard to his tours and work, remaining subordinate to the Director of Agriculture in all matters regarding his pay, leave and discipline. His head-quarters have been fixed in Bangalore. In November Mr. Cecil Wood was appointed Principal of the Agricultural College, in place of Mr. Shepperson, who left at the end of his three years' agreement, and Mr. G. R. Hilson, B.Sc., was recruited in place of Mr. Wood and joined his post as Deputy Director of Agriculture, Northern Division, on 14th March 1910. M.R.Ry. Ananda Rao was in charge of the office of Deputy Director of Agriculture, Northern Division, during the interval between the departure of Mr. Wood in November and the arrival of Mr. Hilson in March.

The sanction of the Secretary of State to the appointment of a Mycologist for the Madras Presidency was conveyed in G.O., No. 2871, Revenue, of 19th October last. Mr. W. McRae, M.A., B.Sc., was appointed to the post and reported his arrival in Madras on 5th January.

Mr. Harrison was confirmed in his appointment as Madras Agricultural Chemist in G.O., Mis. No. 3407, Revenue, of 11th December 1909, and Mr. Sampson, as Deputy Director of Agriculture, Southern Division, with effect from 17th April 1910, in G.O., Mis. No. 863, Revenue, of 19th March 1910.

3. I spent 172 days on tour and visited all the agricultural stations. I also attended the annual meeting of the United Planters' Association of Southern India at Bangalore in August and the Board of Agriculture at Pusa in February. Messrs. Wood and Harrison accompanied me to Pusa.

4. There are still seven vacancies in the grades of Farm Managers and Assistant Farm Managers, which there is no prospect of filling at present.

In G.O., No. 2595, Revenue, dated 20th September 1909, the services of M.R.Ry. K. Rangachariar were placed at the disposal of the Agricultural Department for a period of five years, to assist in the teaching and other botanical work at Coimbatore.

II.—SCIENTIFIC AND NATIONAL ENQUIRY.

A.—Entomology.

5. There are now three trained Entomological Assistants, the third, M.R.Ry. K. S. Padmanabha Aiyar, having returned from training at Pusa in April last. One is permanently engaged at the Agricultural College for teaching the students and field work on the Central Farm and in the vicinity. His draft lectures are sent for revision to the Imperial Entomologist. The other two Entomological Assistants are sent to investigate outbreaks of pests in the different parts of the Presidency, when they are reported, and suggest practical remedies, the intention being to have one Assistant available for each of the Deputy Directors. The chief pests investigated this year have been the paddy stem-borer in several districts, the grasshopper in Bellary and Tinnevelly, and the hairy caterpillar in South Arcot.

The latter is a serious pest, and as the light trap has been proved to be an efficient protection, its use was demonstrated in the affected villages and a leaflet has been prepared for distribution in the vernacular, giving a brief life history of the pest with an illustrative plate of the different stages of the insect itself, with instructions for the use of the light trap.

For the grasshopper in Tinnevelly, which was unusually bad this year, and entirely ate off some of the early crops, the sweep-bag has been found useful, and the Entomological Assistant made a bag and demonstrated its use to the ryots near Koilpatti farm. Further investigation into the paddy stem-borer will be made in the current year.

6. Experiments will be made on the Central Farm with the eri silk worm, which feeds on the leaf of the castor plant, to see if it is likely to pay. The cocoons cannot be reeled like the mulberry silk worm, but can easily be spun like cotton, and the silk produced is very durable.

7. A large number of insects were collected and identified and notes made on their life history and distribution. What is required now is the application of the knowledge acquired to preventive or remedial measures in the field. This is, of course, the only practical test of the utility of the work. The difficulty of dealing with field pests is enhanced by the want of co-operation among the cultivators, but special attention will be paid to the matter in the current year.

8. Though Mr. Lefroy was unable to visit the Presidency during the year under report, he has since come and thoroughly inspected the work of the Assistants and the collections. The best thanks of the Department are due to him for the continual help received throughout the year.

B.—Mycology.

9. The Officiating Imperial Mycologist visited the Wynaad in November at the request of the Planters' Association to enquire into the Nectria fungus disease of pepper and arranged in consultation with the Scientific Officer a series of experiments with some practical remedies. Further experiments will be required to ascertain the life history of the fungus and the manner of its propagation.

On his way back to Pusa he visited Bapatla to investigate the palm disease reported to exist there, but found that the deaths of the trees were not due to the Gódávari fungus.

10. The Mycological Assistant M.R.Ry. S. Sundararaman completed his training at Pusa on 31st March and returned to Madras.

Since he joined his appointment Mr. McRae has spent some time in the Gódávari and Kistna districts in inspecting the operations for the eradication of the palmyra fungus. He has begun experiments on the smut of cholam, and has visited

the Nilgiris to investigate the potato disease, which is reported to have been worse than usual this year. Several other important lines of work are awaiting investigation, and it is a matter for congratulation that Madras has been the first among the Provinces to obtain its own Mycologist.

11. *The Gódávari fungus disease operations.*—During the year Rs. 12,459–6–11 was spent on the measures for the eradication of the disease in Gódávari and Rs. 659–3–1 in Kistna, an establishment of nine Revenue Inspectors with peons having been sanctioned for work in the latter district in G.O., No. 2958, Revenue, dated 29th October last.

The question of continuing the operations is under the consideration of Government at the time of writing. I consider that the operations in the Gódávari district have caused a diminution of the disease and have prevented it from spreading to new centres. In the Kistna district, where operations have only just begun, the disease has spread rapidly. It is hoped that Mr. McRae may be able to throw some light on the manner in which the disease is propagated, so that we shall no longer be working in the dark.

At the close of the year Mr. W. K. Green who has been energetically conducting the operations throughout the year, was transferred to other duty, and M.R.Ry. S. V. Narasimmachary has been appointed to direct the operations.

C.—Seed and Other Products Supplied To and Received From Other Provinces and Abroad.

12. Two new seedling canes, numbered B. 3412 and B. 6450 were received from the Superintendent of Agriculture, Barbados and have been planted at Samalkota. Dr. T. Guthrie of the Colonial Sugar Refining Co., Sydney, kindly brought two new canes from Fiji, which have been planted at the Taliparamba farm. All are reported to have germinated successfully. Three varieties of groundnuts were obtained from the Superintendent of Agriculture, Fiji.

A small quantity of Georgian cotton seed was kindly supplied by the American Consul in Madras, and has been sown at Palur. The results are not yet to hand. The new Transvaal Cumbus have done very well at Coimbatore. Three dozen plants of a fine variety of orange from Northern Burma, known as the Hsipaw orange were imported and distributed in the Nilgiris, where they were planted in Sim's Park, Coonoor and Burliyar, and by Mr. Oakes and Mr. C. Gray. Others were sent to Mr. Michie Smith at Kodaikánal and Mr. P. G. Tipping in Coorg. The new varieties of maize imported from the Transvaal are doing well, and seed has been distributed to selected ryots in Tanjore and North Arcot.

Supplied to other countries.—700 lbs. of Malabar hill paddy was supplied to British East Africa, ten bushels of fine samba varieties to the Ceylon Agricultural Society, and also a representative collection of the chief paddies, dry grains and fodders cultivated in Madras. Two samples of dry land paddies from Gódávari were supplied to the Deputy Director of Agriculture, Bombay. Numerous other requisitions for small quantities of seed and produce were complied with.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

A.—Buildings and Laying Out of Farms.

13. The Coimbatore College was completed during the year under report, and formally opened by His Excellency the Governor on 14th July. The construction of a boundary wall at a cost of Rs 12,400 was sanctioned in G.O., No. 1054 W. of 27th September 1909. Good progress has been made with the wall, which, when completed, will greatly improve the appearance of the College.

A sum of Rs. 1850 was sanctioned in G.O., No. 84 W. of 2nd February for widening the Lawley Road. The double avenue of Mahogany and Rain trees is coming on well. An estimate for the construction of a Pot plant culture house at a cost of Rs. 11,200 was sanctioned in G.O., No. 887 W. of 20th August 1909. Estimates amounting to Rs. 32,900 for the water-supply of the College, and book cases for the Library were sanctioned in G.O., No. 362 W. of 16th April 1910.

Proposals have been submitted for the construction of a dairy so that the students may be taught the elements of dairying.

On the Agricultural stations no important works were executed, with the exception of the seed store at Koilpatti which was almost completed in the year.

B.—Crops.

14. *Agricultural stations.*—As before, attention has been concentrated on practical work on the main food and industrial crops, paddy, cotton, sugarcane and groundnut occupying most of the time of the department. The efficiency of the Farm Managers and Assistant Managers is improving and satisfactory progress has been made with all the chief lines of work.

15. *Sugar-cane introduction.*—In Gódávari the Mauritius canes have practically displaced the old canes, which are now seldom seen. There was keen competition this year again for the new B. 208 cane. One hundred and twenty applications were complied with, the canes being distributed over as many different villages as possible. It has also been introduced into Malabar, South Arcot, Vizagapatam and Coimbatore. This cane, which is now cultivated in many parts of the world, has a very high sugar content, and is a most valuable acquisition to the country. In South Arcot very satisfactory progress has to be recorded. Though it is only three years since the Red Mauritius canes were sent there from Melrosapuram it is estimated that there are nearly 700 acres under that cane in the Cuddalore taluk and the cane cultivation which fell to 180 acres in 1908–1909 and seemed on the point of extinction, has increased from 466 acres to an estimated area of 1,000 acres in the current year, three quarters of which is Mauritius cane introduced by the Department. This rapid expansion is due to the success of the experiments conducted with the new canes at Nellikuppam referred to in paragraph 16 of last year's report, and a very interesting point in this connection is that about a quarter of the area planted is on irrigated dry land watered from wells. The new canes give about twice the produce of the old and their harder rind makes them almost proof against jackals, a source of great loss before.

16. In South Canara and Malabar the same canes have been distributed to selected cultivators. In the former district the cultivators are familiar with cane cultivation, but the local varieties are poor and the method of cultivation imperfect. Selected cultivators have been supplied with Mauritius canes, and trained coolies sent, in company with the Farm Manager, to show them better methods of cultivation. In Malabar the cultivation of cane is practically unknown, and all the details of cultivation, as well as the manufacture of jaggery, have had to be taught the people from the beginning. The prospects are very promising. The canes grow to an extraordinary size on this coast, and though the juice is not so good as on the East Coast, good jaggery can be made from it. The increased profits to the cultivators from the cultivation of the new canes more than equal the whole cost of the department.

17. *Sugar-cane experiments.*—The manurial experiments at Samalkota show that the addition of superphosphate and potash, with and without lime, in addition to castor cake, does not pay. The cultivation experiments show that the only improvement which can be recommended to the Gódávari cultivator is the planting of his canes in rows, instead of scattering them about the field at random, which increases the cost of the subsequent cultivation. There is still some disease in the district, but on a small scale. Experiments at Taliparamba have shown the value of deep draining. The canes grow better and withstand drought. This has been confirmed by the experiments at Nellikuppam. At Palur it has been shown that the common belief of the ryots that the canes deteriorate after flowering is incorrect.

18. *Groundnut introduction.*—Good progress continues on the West Coast. Mr. Sampson and I visited many of the plots in Malabar and South Canara. During my visit to the latter district, I found that groundnut oil was being regularly consumed in the district, being imported from other places. To encourage the local cultivation, it was arranged to send an Assistant Manager with a trained cooly up there to show the local oil makers how to extract oil from the groundnuts grown in the district. In the north of the district a large variety of groundnut has been imported from

Vingerla in Bombay and seems to suit the local conditions better than the Mauritius nut, and is more palatable to eat. The crop has now had a fair start in the district, and should establish itself gradually in the local cultivation. At Taliparamba, on the dry or 'modan' land a yield of 1,644 lbs. of dried nuts per acre was obtained from a plot to which eight cart-loads of ashes were applied. The unmanured plot gave only 320 lbs. This shows that manuring will be necessary if the crop is to succeed on the West Coast, and may be the explanation of the poor results obtained in many places. The Agricultural Chemist considers that, in view of the deficiency of lime in these laterite soils, superphosphate may be useful. Experiments will be made with it during the current year.

19. In the returns for the Presidency a decrease is shown in South Arcot, but an increase in other districts. It is a common complaint in South Arcot that the crop is not so productive as before. The land appears to be "sick" of the crop, and, as an alternative, Cambodia cotton has been tried on the Palur farm this year. On good irrigated land this promises to give a return of Rs. 150 per acre. It has attracted much attention, and many cultivators intend to give it a trial next season. Reference to this crop will be made again below.

20. *Groundnut experiments.*—As pointed out in the Palur report, the greatest obstacle to the more rapid spread of the crop is the tendency in districts where the crop is new to grow it year after year on the same land. The cereal rotation experiments at Palur aim at discovering the best rotation crops to grow along with groundnut. They show so far that the rotation usually followed in South Arcot, of cumbu and groundnuts, is the best, and the mixed crop gives a larger return than either crop grown alone.

21. *New varieties.*—The experiments at Palur show that on dry land without irrigation Big Japanese and Tatas have given a larger yield than the local nuts for the last three years, but on irrigated land Madagascar and Senegal were the best this year. The local nut still contains more oil, and cannot yet be said to have been displaced. It is, however, satisfactory to know that several other varieties have been found which are sufficiently good to take its place if it should deteriorate.

22. *Cotton—(a) Improvement of seed and seed distribution.*—The work under this head falls into two divisions; (1) the growing and distribution on a large scale of Karunganni seed in Tinnevelly and Northerns cotton in Kurnool and (2) the improvement of the local cottons in all the districts where we have farms by separation of different varieties, selection and breeding. For growing Karunganni seed 550 acres of private land were leased on the following terms. The owner guarantees that cotton was not grown on the land the previous year. He ploughs the land four times in the hot weather and pens sheep on it. The seed is supplied by the department and sowing and bullock hoeing done by the department with cattle hired from the ryot. The rest of the cultivation is attended to by the ryot.

In the previous year 263 acres of land had been taken up in Tinnevelly for growing Karunganni cotton, and 140,000 lbs. of pure seed was available for distribution. Seed depots were opened in 37 villages and 15,600 acres were sown. The last three seasons have been dry, and favoured the Karunganni variety, with the result that these operations have had a greater success than was hoped for. All through the southern part of the district Karunganni cotton now predominates, and it is estimated that 80,000 acres were sown with pure Karunganni last year. In this tract it appears to give a better crop than Uppam. The lint is of much better quality than that of Uppam. It is, therefore, clear that the re-establishment of Karunganni has been of great pecuniary advantage to both the grower and the spinner, though it is not possible to estimate the exact amount. In the year under report, 550 acres of seed farm were sown, and in future it will be possible to confine the seed distribution to seed grown on the seed farms. These are supplied with seed grown on the Koilpatti farm, where the crop is being improved year by year. By this means a continuous improvement can be effected in the district cotton.

The trials of the different varieties at Nandyal showed that there was little to choose between White Northerns and Gadag, though the former was slightly better. Arrangements were therefore made to sow 135 acres of seed farm with this variety;

the seed from this will be available for sowing in the current year. The reports received from the Buckingham Mills showed that cotton grown from this seed is decidedly better than that from the ordinary ryots' crops.

Plant improvement.—The first object of these experiments is to increase the profits of the cultivator. This is done by producing a plant which gives a higher percentage of lint to seed than the local varieties. One village which used farm seed last year sold its crop at Rs. 2 per candy of kapas over the current price on account of its higher ginning percentage. The plant must also be productive and well-shaped, so that it may not be blown about by the wind or trail its lower branches on the ground, thereby spoiling the cotton. The second object is to improve the quality of the cotton, and thus enable the grower to get a better price, and the local mills to turn out a higher class of goods, more capable of competing with the imported cloth. Differences of seasons cause variations in quality and percentage of lint every year, and so some years will be necessary before it can be claimed with certainty that an improved cotton has been produced. At Koilpatti, however, yearly selection of the best plants, and also crossing *inter se* have produced a variety which gives as much as 34 per cent. of lint, 7 per cent. more than the local crops, and another variety with a staple which has been pronounced by the mills as equal to Georgia Upland and fit for spinning 40^{s} twist. Further trials on a larger scale will be required to confirm this.

Work on the same lines has been going on at Nandyal, Hagari and Bellary. Single plants are selected, expert opinion is obtained on the lint and the finally selected plants are being cultivated till a sufficient quantity of cotton is available to enable spinning tests to be carried out. As the best experts cannot pronounce a final opinion till at least a bale (400 lb.) is available, several years are required before the real value of the selected plant is known. In the meantime, other selections are being made, so that a constant succession of selected strains may be available. The general opinion is that this line of work holds out more promise of solid improvement than any other. Pending the results of this scientific work, the effect of even the rough selection of the best plants in every field every year has already produced a considerable improvement in the general farm crops at Koilpatti and Nandyal, the seed from which can already be distributed to the ryots with great benefit to the general crops of the districts.

Cambodia cotton.—This cotton, which is an acclimatised variety of American, has come into prominence of late years as a "garden" crop in Tinnevelly. On mixed and red soils, with occasional irrigation, yields hitherto thought impossible in India have been obtained, and thousands of acres are now under this crop. Attempts are being made to introduce it into other parts of the Presidency. The sudden rise into importance of this cotton has a double significance. In the first place, the lint is superior to that of any of the indigenous cottons, and will enable the Indian mills to produce yarn and cloth of better quality than is possible at present. The second point is that it can be grown on land unsuited for the indigenous cottons, and gives a far higher yield. If the hopes which are now, with good reason, entertained about it should be fulfilled, it will increase the production of Indian cotton, a matter of importance in view of the world-wide scarcity of raw material from which the industry is suffering. As mentioned above, the experimental plot at Palur has given good results, the produce being more than a bale (400 lb.) of clean cotton per acre. The co-operation of two European Firms has been secured for the extension of the crop.

At Coimbatore, the Government Botanist has begun experiments on Mendelian lines with this cotton, with a view of combining the good points of this and other similar acclimatised varieties, and the first year's work justifies the hope that success may be attained.

23. (*b*) *Improvement of cotton cultivation.*—The introduction of the drill system of cultivation in Tinnevelly continues to make satisfactory progress. I inspected some of the chief drilled areas with Mr. Sampson in January, and everywhere the crops were better than those sown broadcast, the characteristics of the drilled fields being the evenness of the whole field, due to good and uniform germination, and the vigorous growth of the plants, due to the frequent subsequent cultivation, which

conserves the moisture in the soil. Including the seed farms, 2,100 acres of land were sown with the drill this year. On the Koilpatti farm, cumbu was sown with the drill this year for the first time, with good results. A number of cultivators were brought to see the crop, and decided to sow their own crops in this way next season. This should give a further stimulus to the movement in favour of drilling, as cumbu is the chief food crop of the cotton growing tracts.

I questioned several cultivators as to the advantages gained by the use of the drill on their lands. The general opinion was that there was a saving of Rs. 1-8-0 in cultivation expenses per acre, and a gain of half a pothi of kapas of crop. The value of half a pothi is at present Rs. 16. In view of the fact that drilling enables precious time to be saved at the sowing season, and that drilled crops are, to a large measure, protected against drought, I believe that this estimate of the gain by drilling is on the safe side. On the 2,100 acres drilled last year, therefore, there would be in a normal season a gain to the cultivators of Rs. 36,750. The total net cost of all the operations in the Tinnevelly district, including the cost of the Koilpatti farm, during the year was Rs. 11,875. The success which has attended these operations is due to Mr. Sampson's efficient organisation and management, and to the active and intelligent supervision of the district work by M.R.Ry. A. V. Tirumuruganatham Pillai, Manager of the Koilpatti farm. The difficulties attending the introduction of an entirely new system of cultivation, however successful it may be, are very great.

24. *Premia for growing pure cotton.*—In G.O., No. 2415, Revenue, of 1st September, the system of granting premia for growing practically pure crops of cotton was given up, as it proved ineffectual.

25. *Paddy experiments.*—The work on paddy consisted of the trial of new varieties, spacing and manuring experiments, and experiments with seed-beds and transplantation. Space does not permit of more than a brief outline of the work here. The fullest account will be found in Mr. Wood's Samalkota report, which deserves a careful perusal.

Varieties.—There are two difficulties in introducing new varieties of paddy. The first is that the people are accustomed to eat a certain kind of grain and do not care to try new kinds The second is that the change of conditions causes great variations in the crop, which sometimes assumes several new forms. This has been specially the case with banku. Further selection then becomes necessary if the character of the variety is to be maintained. With the exception of banku, which has given very good results both at Palur and Samalkota, there is no new variety which seems at present likely to make a position for itself. The introduction, acclimatisation and testing of new varieties will always remain a useful line of work, as it is impossible to suppose that the present distribution of varieties is the best possible.

The spacing and green manuring experiments are now more of the nature of practical demonstrations than experiments. The results from small plots on the Government farms naturally do not always give consistent results, and in some cases three or more seedlings have given better results than singles. It is noticeable, however, that cultivators who have tried single planting seldom fail to express satisfaction with the results. On the Samalkota farm the standard planting is single seedlings 9 inches apart. The Samalkota seed rate is 6 lb per acre. In Gódávari the local seed rate is 70 lb per acre. In many districts it is double this. As Mr. Wood says in his Samalkota report: "These figures surely give room for thought, and make it a matter of no doubt that very large economies could be effected in every district, some more, some less, in the matter of seed rate."

26. Referring to G.O., Mis. No. 918, Revenue, of 24th March, the following steps have been taken to extend the knowledge of this system. At Palur, Samalkota, Taliparamba, Nandyal, and in the villages round Hagari, arrangements were made to demonstrate the advantages of the system on plots of ryots' land. At Palur and Nandyal several plots on ryots' land were planted in this way last year, and the good results obtained by those who tried it will influence many others to follow

their example this year. It is the regular practice, on all the farms, for the Managers and Assistant Managers to visit the neighbouring villages as often as possible, and advocate this among other improvements. Several vernacular leaflets have been issued during the last three years describing the advantages of the system and giving simple instructions how to carry it out. At the beginning of the current year three specially selected subordinates were sent on a lecturing tour in Tanjore with a large supply of Tamil leaflets on single planting and green manuring with a view to popularize the system. Reports received up to the time of writing show that the improvements recommended will be carried out on thousands of acres this season. Progress is also being made with single planting in Tinnevelly and South Arcot. At Coimbatore the ryots in the vicinity of the farm have reduced their seed rate by one-half, after seeing the success of the farm system of cultivation. Many cultivators in Tanjore who have adopted single planting have reduced their seed rate from 40 to 50 M.M. to 3 M.M. per acre, no inconsiderable saving, when the enormous area under paddy is taken into account. In Gódávari the Collector was asked to order the Tahsildars to visit the Samalkota farm when the paddy crops were ripe and bring a few of the best cultivators with them. I happened to be there when several of these parties came and I showed them the experiments. They appeared to be satisfied that the crops, which were all singly planted, were better than their own. Many of them ordered large quantities of seed and promised to try single planting next year. Articles are constantly published in the English and Vernacular Press on the same subject.

27. A suggestion is made by Mr. Sampson in his Palur report that one reason for the success of economic planting is that the free movement of irrigation water, with the consequent aeration of the soil, has much to do with the growth of the crop and its yield. In a thickly planted field the circulation of the water is impeded. More water would, on this supposition, be required for a thickly planted crop. The question is one of great importance, and will be investigated as soon as possible. It is well known that moving water, even if shallow, is better for the crops than water which is deep but stagnant.

28. The green manuring crops at Coimbatore, Palur, Samalkota and Taliparamba gave good results. The Taliparamba experiments show that the productive capacity of the Malabar wet lands can be almost doubled in a short time, mainly by green manuring, without any great outlay or additional expense in cultivation. This would go far to make Malabar self-supporting in paddy, which is far from being the case at present.

When sunn hemp can be got to grow, no better green manure could be desired, but it is very subject to insect attacks and requires protection from cattle. Sesbania aculeata, a plant much used in Bengal for green manuring, has been tried during the past year at Palur and gave very good results. Unlike sunn hemp it will grow on land which is slightly saline. It produces a very heavy crop, it is thorny and unpalatable to cattle, and seems to suffer little from insect attacks. It is being tried at Coimbatore, Palur, and Samalkota this year, and arrangements are being made to procure a larger quantity of seed. There is little doubt that it will prove a valuable acquisition. The plant is indigenous and grows wild in many parts of the Presidency. Green manuring is little practised in Tanjore, and with a view to popularise the practice Rs. 1,500 worth of wild indigo, sunn hemp, and indigo seeds were purchased for sale. The whole stock was disposed of in a short time. This year a sum of Rs. 5,000 has been provided for the same purpose. It is hoped to create a demand for the seed, and then hand over the business to private enterprise. Very useful work has been done in this and other directions in the Tanjore delta by Farm Manager C. Narayana Aiyar, who has been placed on special duty to study the paddy cultivation of Tanjore and see what improvements can be effected.

The Hagari experiments in irrigating black cotton soil have been given up, but the results obtained are worth recording. They are, briefly, that land of this description requires heavy manuring with green leaves for several years before it will yield even moderate paddy crops. It also requires a liberal water supply. The action of the green leaf is partly chemical and partly physical, and it cannot be replaced by cattle manure for the purpose of bringing this land into condition to grow paddy.

29. *Pati Mannu substitutes.*—Good results were obtained from the mixed fertilisers applied in the previous year, and in the year under report a series of experiments in duplicate plots were laid down in five villages to determine whether

any of the elements supplied in the mixtures could be omitted, and thus the cost reduced. A similar experiment was laid down at Coimbatore. These will have to be continued for a good many years before any definite result can be arrived at. All that can be said from this year's working is that superphosphate appears to have a greater effect than potash. If subsequent results confirm this it will be possible to reduce the cost of the fertiliser, as potash is far more expensive.

At Uppalur the cumulative and residual experiments with mixture No. 1, containing bone meal and potassium sulphate, showed that the effects of this manure last for at least two years, which means that the cost per acre of the manure will be halved. In the current year, in addition to the standard experimental plots, demonstration plots of a complete fertiliser have been arranged for, in a number of different centres. It is believed that with the present price of paddy it would pay cultivators to use a comparatively expensive fertiliser, when pati mannu is not available. In some places ryots already apply two and even three candies of poonac per acre to paddy, costing Rs. 15 per candy. Of the fertilisers tried at Coimbatore far the best results were obtained by milled-fish, at a cost of Rs. 16 per acre. I believe that a great increase in the consumption of concentrated fertilisers may be expected in the near future.

30. *Second crop experiment in Gódávari.*—The experiment described in paragraph 28 of last year's report, of planting the second crop early to save the waste of water involved by the present system, showed that the ordinary "Dalwa" and Banku paddy will not succeed if so sown early. A fair crop, however, was obtained from Garike Sannavari. The actual weighments are not yet to hand. Trial will be made again this year with this and other varieties.

31. *Fibres.*—The present state of the Hindupur fibre experiments is detailed in the administrative report of the Northern division. The estimated yields of fibre from the experimental cuttings made this year gave from 200 to 300 lbs. per acre. Further investigation of the subject points to the fact that for successful production of fibre on a commercial scale there must be a combination of several conditions, chief among which is an abundant supply of cheap and efficient labour. It is doubtful if these conditions are present at Hindupur.

The change of Deputy Directors during the year prevented a definite conclusion regarding this plantation being arrived at. A report will be submitted during the current year.

32. *Ridge and furrow irrigation.*—These experiments at Koilpatti again showed a profit in favour of the system in the rainy season, and it is satisfactory to read that several of the onion-growing villages in the neighbourhood are adopting the practice. At Coimbatore a saving of water was effected by the ridge and furrow system, but otherwise the results were inconclusive.

33. *Saline land experiments.*—In his note prepared for the saline land committee at the last Board of Agriculture, Mr. Harrison reviewed the saline land question as far as it concerned this Presidency, and showed that the question here was one of very minor importance, and that the methods of reclaiming saline land have been thoroughly worked out in Egypt and America It is now a mere question whether the application of these measures, which consist of a system of flooding and draining followed by suitable cultivation, would be repaid by the value of the land. Large areas have been and are still being reclaimed by the ryots when the demand for land is keen enough, by frequent floodings, and the application of bulky organic manures, and by growing suitable crops on the land.

34. During the year I submitted my report on the Ponnalur tank, and recommended that those who wished to grow wet crops should be permitted to do so on payment of the full rates. It was decided to await the results of fasli 1319 before coming to a final decision in the matter.

35. *Pepper.*—The season was a favourable one, and the improvement in the pepper gardens at Taliparamba continues. Owing to differences in soil, aspect, elevation, etc., the plots are uneven in quality, and hence it would not be safe to place too much reliance on the comparative results. It may be said that green-manuring is not very successful, as the shade of the garden is too heavy for the green-manuring plants to grow well. The most successful manures are fish manure, and

lime and leaf-mould. The Mycologist proposes to conduct experiments here on the Wynaad fungus disease this year. The general result of the station may be summed up by saying that it demonstrates that good cultivation will restore even a poor garden to a good condition. The local custom is to abandon a garden when its production falls off and take up a new piece of land. This will not be possible for ever.

36. *Tobacco experiments.*—In Government Orders, No. 1551, Revenue, of 9th June 1909 and No. 137, Revenue, of 14th January 1910, Government sanctioned the lease to Mr. T. H. Barry of fourteen lankas at a rental of Rs. 8,557 per annum for ten years in order to secure to him the continuous possession of land necessary for his experiments. I visited the lankas in March. The north-east rains on which the tobacco crop depends were almost a total failure this year. In view of this, the tobacco was much better than I expected. The experiment consists of an attempt to grow wrappers for Indian cigars from Sumatra tobacco grown on the lankas. It is evident that the difficulties in connection with the cultivation of the crop have been successfully surmounted. The quality of the finished product depends, however, on the subsequent processes of drying and fermentation. Last year's crop has not yet been fermented. If Mr. Barry is successful in this, a new industry will have been opened up, the prospects of which have been greatly improved by the recently imposed import duties on tobacco. At present all superior kinds of Indian cigars are covered with imported wrappers made from Sumatra leaf. Incidentally, Mr. Barry is introducing improvements into the local cultivation. A green manuring crop of sunn-hemp had been grown on one field with very good results.

37. *Ganja.*—At the request of the Abkári Department one acre of ganja was cultivated this year on the Coimbatore farm. The cultivation was attended to by the Abkári Department and the results are not available here, but are believed to have been satisfactory.

38. *Implements.*—At present it is thought that there is little scope for the introduction of new implements. A number of Messrs. Massey & Co.'s light iron ploughs have, however, been sold by the Manager on special duty in Tanjore, and endeavours are being made to get the sale taken up by a local agent. A small Archimedian screw water-lift has been tried with good results for low lifts in Tanjore. At Palur there is a fair demand for the triangular harrow for dry land cultivation, and for the modified form of the Scind plough for dry lands.

39. *General.*—At the reorganization of the department three years ago both the Deputy Directors were new to the country and people. They have now gained a fair knowledge of both. Their subordinates had, many of them, been working for years in the Revenue and other departments, and forgotten what they had learnt at Saidapet. The Deputy Directors have devoted special personal attention to the training of their subordinates, realising that the efficiency of the agency through which the cultivators are to be approached, and the farms managed, is of the utmost importance. In consequence I am glad to be able to report a very marked improvement in the work of the staff. They have gained a thorough knowledge of the local cultivation round the farms, and are on intimate and friendly relations with the ryots. The latter have lost what suspicions they had regarding the work of the department. They take a keen interest in the farms, visit them in increasing numbers, buy large quantities of seed from them, and, in many cases, adopt the improvements recommended by the department. Much more rapid progress may be looked for in the near future. Definite programmes of practical work outside the farms have been drawn up for each farm and the Manager submits a list of the improvements to be introduced on the ryots' lands during the year.

40. *Bulletins, etc.*—Bulletin Nos. 60 and 61 on the cattle of Southern India by Colonel Gunn, and on improvements in paddy cultivation at Sivagiri by Mr. Lonsdale were issued during the year. Vernacular leaflets were published on banku paddy, the uses of the harrow, cotton cultivation, single planting of paddy, manuring in the Kistna delta and green manuring. Notes have been sent to the Vernacular Press on the use of the seed drill for sowing cotton, seed selection, on pepper and on Cambodia cotton. Occasional notes and articles are published in the English Press. Notices were also published in the district gazettes on the facilities

afforded at Coimbatore to landowners for getting reports free of charge on their soils and manures by the Agricultural Chemist. A large number of samples were received for analysis in response to this. The special object of this was to draw attention to the value of oil-cakes and bones, which are now exported in such large quantities.

The Agricultural calendar was published as usual in English, Tamil and Telugu.

A free copy was sent to every Elementary school. The Government is considering the question of supplying it to village officers.

C.—Agricultural Associations, Shows, etc.

41. Agricultural exhibitions and cattle shows were held at Ongole, Madura, Kizhur, Kalyandrug, Ellore, Pithapur, Berhampur and Kottavalsa.

Little can be said regarding the work of the Agricultural Associations. In Malabar and South Canara, under the direct management of the Collectors and Divisional Officers, good work has been done, especially in the introduction of ground-nut and sugarcane. The Kumbakónam Association demonstrated the single planting of paddy. Most of the associations are inactive. The usual state of affairs is that the Honorary Secretary is a vakil, who is an enthusiastic amateur. The members neither pay their subscriptions nor take any interest in the association. I am consulting all Collectors regarding the best way to reconstitute the associations on a more practical basis. Little can be done till there is a representative of the Agricultural Department permanently stationed in each district, to direct the efforts of the associations, visit the members, and help them with expert advice. It has not been sufficiently recognised in the past that ryots, whose profession is agriculture, place no confidence in advice given by amateurs, even though it may be sound in itself. It is not sufficient to tell them what to do. They require also to be shown how to do it. Some years must necessarily elapse before trained men are available for every district. I am considering how a beginning can be made.

IV.—BOTANY.

42. The report of the Government Botanist has already been submitted. M.R.Ry. K. Rangachari, who was appointed to the post of Assistant in Economic Botany, joined his post in October. Most of the time of the Government Botanist was occupied in teaching. Good progress was made with the laying out of the Botanic garden, and the work of improving the indigenous cottons has been taken up. An attempt is being made to combine the erect habit and early maturity of the Bourbon with the many good points of Cambodia, and the first year's work shows that the characteristics are "Mendelian", and that there is, therefore, a possibility of success. Following the lines successfully adopted for the improvement of wheat in Australia, the Government Botanist is studying the cumbu crop, with the idea of obtaining a variety with shorter straw. The straw of cumbu is very poor fodder, and has little value. A variety with shorter straw would be more drought resistant. The second year students completed their Botany, and were examined in March by Mr. Martin Leake of the United Provinces with the Government Botanist. All except four qualified for the diploma.

V.—CHEMISTRY.

43. As in the case of the Government Botanist, most of the time of the Agricultural Chemist was devoted to teaching. The examination for the diploma was held in March by Mr. Warth of Burma, with the Agricultural Chemist. The results were very satisfactory, all but three students obtaining the diploma.

Partly in consequence of the steps referred to above, taken to give publicity to the work of the Agricultural Chemist, there was a large increase in the number of samples sent for analysis. Mr. Harrison remarks that "a pleasing feature of this year's work is the fact that samples of soil and manures were received from cultivators residing in various parts of the Presidency, and there seems to be every probability of this branch of the work extending considerably in the near future". Reference has already been made to the work of the Agricultural Chemist on manures for

paddy. The study of the gases given off during the preliminary cultivation of paddy may show that waste is caused by the too early application of bulky manures to paddy. When the pot culture house is completed, I hope that the Agricultural Chemist may be able to investigate the subject of the effect of ploughing paddy fallows in the hot weather, a practice regarding which different opinions are held by cultivators in different parts of the country.

No suitable applicant has yet been found for the post of Chief Assistant for Research.

VI.—AGRICULTURAL EDUCATION.

44. Though the full number of students was admitted each term, the total number of students at the College at the end of the year was only 32 instead of 40. This is due to some of the selected students failing to join the College, and to some of those who have undergone a part of the course leaving without completing it, for various private reasons. Some natural alarm was caused by the prevalence of plague in the town. Provided that the course of instruction has not advanced too far, the places of those that leave are filled up by new recruits. Steps are being taken to minimize this. The students were examined on their practical work by the Deputy Directors in July, who made some useful suggestions for its improvement with a view to training the students' powers of observation, and the practical application of the information imparted at the College. Effect was given to these recommendations with the result that, when Mr. Sampson examined the students again in December, he reported that great improvement had been effected. All the students had a thorough knowledge of the farm work, and were keenly interested in the subject. The discipline and conduct of the students have been good. Taking over charge of the College, as he did, in the middle of the term, Mr. Wood has had a very hard task to perform in teaching, and managing the large farm and settlement. He has thrown the greatest enthusiasm and energy into the work and the College and Farm are now in a thoroughly satisfactory condition. No student can pass through the College now without acquiring a thorough practical knowledge of all the agricultural operations. Credit is also due to M.R.Ry. J. Chelvaranga Raju, the Principal's Chief Assistant, for the thoroughness with which he has supervised the field work of the students and to M.R.Ry. Ramaswamy Sivan, the Warden of the Hostels, for the manner in which he reassured the students during the plague scare, and kept them to their work, and helped and advised them in regard to their private affairs.

45. *Non-official visitors.*—M.R.Ry. Rao Bahadur Hanumantha Gowd Garu visited the College twice, and the Zamindar of Singampatti on one occasion. Both of them made a number of suggestions, which have been given effect to as far as possible.

46. *Publications.*—The number of publications received from and sent to other countries and other Provincial departments was as follows :—

	Indian.	Foreign.
Journals	21	74
Bulletins	36	257
Reports	293	59

M. E. COUCHMAN,
Director of Agriculture.

APPENDIX I.

THE ADMINISTRATION REPORTS OF THE AGRICULTURAL STATIONS DURING THE YEAR 1909–1910.

Administrative Report of the Agricultural Stations, Northern Division.

The head-quarters of the Northern division continued to be at Bellary during the year. Mr. R. C. Wood continued as Deputy Director up to November 18th, 1909, with the exception of one month's privilege leave. During that period he spent 115 days in camp. On his transference to Coimbatore as Principal of the Agricultural College, charge of the division was taken over by M.R.Ry. D. Ananda Rao Garu, Assistant Director, who continued in charge until March 23rd, 1910, when he was relieved by the newly appointed Deputy Director Mr. G. R. Hilson. While in charge of the division the Assistant Director spent 111 days in camp. Of the remaining period up to the end of the year the Deputy Director spent six days in camp. All the Agricultural stations were visited during the year—Hagari four times, Nandyal four times, Bezwada six times, Samalkota seven times and Hindupur twice.

2. *Staff.*—The executive staff has been increased by one Assistant Director and the clerical staff by the posting of a Farm clerk to Bezwada. The Manager at Samalkota has been changed. The Manager and Assistant Manager at Hagari have continued throughout the year. The Manager at Nandyal was in charge for three months out of the year, the farm for the remainder of the time being in charge of the Assistant Manager of Bellary farm, which during that Manager's absence was put under the charge of Hagari Farm Manager. The Manager at Bezwada has been changed, the former Manager having been deputed to patti-mannu work in place of the Manager transferred from that work to Coimbatore. The Assistant Manager who joined the Forest Department has reverted to this Department and has been put in charge of the cotton work in Nandyal valley. No public building is yet available for the location of the head office; but it is expected that this state of affairs will be remedied shortly.

3. The late Deputy Director toured in the Kurnool District in June; in Gódávari and Kistna in August; in Vizagapatam in September and part of October; and in Ganjám in October. The tour in Vizagapatam was made for the purpose of inspecting the methods of agriculture practised under the varying conditions existing there. As a result of this tour it was shown that there exist great possibilities of increasing the scope of activity of the department. The lines that the work should follow are very similar to those already adopted in other districts, viz., economy in use of seed in planting paddy seed beds and single transplanting of paddy; introduction of the ground-nut crop and introduction of improved varieties of sugar-canes. The Kurnool tour was for the purpose of inspecting the new seed farms laid down in the Nandyal valley, which were found to be in a satisfactory condition. As a result of the demonstrations started last year and continued during this, with Massey's C.S. plough, seven more applications for this plough were received and complied with. This argues a more favourable attitude on the part of the ryot as regards this improvement and it is expected that at a not very distant date this plough will be in general use in that district.

4. The Assistant Director also toured in Kistna delta in connection with patti-mannu work and in Kurnool district in connection with the work of cotton improvement.

5. The work started last year for the purpose of discovering and distributing a cheap artificial substitute for patti-mannu was extended. Five experimental plots and eight demonstration plots were laid down. The results obtained though varying somewhat owing to irregularities of ground and rainfall and varying degrees of attention paid to the plots by their owners show that the work is being conducted on the right lines, and further extension of the work is being proceeded with.

6. District work in the vicinity of the farms is on the increase, the farms are becoming more widely known and the number of visitors is also on the increase. It must be noted, however, on this point that Nandyal and Samalkota are more favourably situated than the others, both as regards site and the class of ryot with whom they have to deal.

The main lines on which this district work is being carried out is as follows:—

Hagari and Bellary.

(1) Advocacy of the use of farm cotton seed.
(2) Advisability of single seedling, transplanting of paddy in wet land villages along the Hagari.
(3) Improved methods of cultivation of garden crops.

Nandyal.

(1) Advocacy of use of C.S. plough.
(2) Improvement of paddy cultivation including use of green manure, economical transplanting and selection of seed.

Samalkota.

(1) Improvement of jaggery making by greater cleanliness, straining juice, and more thorough skimming.
(2) Planting canes in rows.
(3) Improvement in paddy cultivation as at Nandyal.

That the work of the department is becoming more widely known may be seen from consideration of the number of agricultural calendars disposed of last year throughout the division, viz., 1,000 English and 3,500 Telugu.

The Bellary Agricultural Station.

7. The season was on the whole fairly favourable; the total rainfall was greater than last year but though it may be said that distribution was slightly better, the close of the season was as usual marked by a long period of drought.

8. The yields from the crops were very moderate and in the case of korra the yield as compared with last year can only be said to be poor. Field No. 8 was again cropped with early jonna and produced a fair yield. Among the late crop varieties, kagi jonna again established its superiority over the others.

9. The work of cotton selection is still in progress and attention has been drawn in the scientific report to the phenomenal increase in percentage of lint in the case of two varieties. The method to be adopted in this work in the future is also fully described.

10. Cotton seed (1,040 lbs.) was distributed to those ryots who applied for it, but owing to the short-handedness of the staff during the sowing season no store was opened in the bazaar as was done formerly and some seed still remains from last year.

11. The experimental plots were all maintained and have received full discussion in the scientific report.

12. The number of visitors to the farm was 110. The farm cattle, with one exception, a bullock which fell lame and is now undergoing treatment in the Veterinary hospital, have all worked fairly well.

The number of permanent coolies is three.

The Hagari Agricultural Station.

13. The investigations to determine the advisability of irrigating black cotton soil were abandoned towards the end of this year.

14. The manurial experiment and the seasonal paddy experiment were however both continued, but the results obtained do not show any variance from those obtained in former years.

15. The final results of last year's experiment dealing with the irrigation of cotton are given in the scientific report. The only additional point elicited was that irrigation on this land did not affect the percentage of lint. With regard to the thinning experiment, it is noteworthy that a fewer number of plants is required under irrigation to give a yield equal to that obtained from unirrigated plants; but it must be borne in mind that the yield per acre from the irrigated cotton is no greater than that obtained from a normal crop of unirrigated cotton and that there is all the extra expense of thinning and irrigating to be put against cultivation expenses. The dry land thinning experiment yields no more information than has been obtained from similar experiments conducted on the other farms.

16. A fresh experiment was devised at the instance of the Agricultural Chemist to test the effect of altering the magnesia-lime ratio in the soil. Though somewhat early to speak definitely, the results are distinctly favourable and further experimental work in this line will be carried out.

17. The results of the smut experiment show the usefulness of copper sulphate as a fungicide in dealing with the cholam crop but more work requires to be done to determine the proper strength of solution to be employed.

18. The improvement of cotton by selection is being proceeded with, and though at present the farm cotton is not notably superior to local, the results of last year's selection looked at in the light of expert opinion, are encouraging.

19. The investigation of garden crops was started this year. Several crops have been grown, spelt wheat, brinjals, maize, a very poor crop, radish, carrots, etc. The local pattimannu is being experimented with, but as yet nothing definite can be said regarding its usefulness on this land.

20. The number of visitors to the farm is on the increase, local applications for seed and use of farm implements have been complied with, and friendly relations between the farm officers and neighbouring ryots are being established.

21. The Farm Manager M. Mangesha Rao continued in charge throughout the year and for a time was in charge of both Hagari and Bellary.

22. The number of bullocks has been reduced. They have all worked well.

The Nandyal Agricultural Station.

23. The season was unfavourable. The soil of the farm is termed in vernacular "Kullu regada"; in years of heavy rainfall such as last year's, crops do not thrive on the land but appear to rot, hence the name. The cotton crop suffered more than the others.

24. The work of cotton selection is still the main work of this farm and is proceeding favourably. The report received on last year's selection is given in the scientific report for this farm, where full discussion of the farm cottons will also be found. Expert opinion will be again obtained as to the value of the various selections.

25. The cultivation experiments conducted last year on this crop were continued; the results obtained, however, do not point to any definite conclusion, the cotton and horse-gram results seem to point in favour of the mixture but are not in favour of thinning and topping. The plots however are uneven. The spacing experiment has suffered the same fate as has befallen this experiment all along, viz., the plots were all too thin. The widest spaced (18″) gave a slightly better yield than the unthinned while the 6″ thinned and 12″ thinned were respectively equal and poorer than the unthinned. Part of the area sown under cotton was sheep-folded and though no definite experiment was laid out, the results are in favour of this system of manuring. The indigo rotation plots are fully discussed in the scientific report. In the variety plots the results are somewhat different from last year's, Gadag having given a much better yield than Northerns. In accordance with the ideas stated last year as to the extremely close relation existing between the two varieties Gadag and Northerns, and after obtaining expert opinion regarding any differences to be found in the lint, it was decided that these two should be mixed and sown on the farm and distributed as Sarcarpathi.

26. Five varieties of Hingari jonna were grown this year and good crops obtained. Cheruku-patcha stil' retains the premier position. The two new varieties have given the worst yields. Nilwa is better than Vanka.

27. As regards district work, the farm has been admirably chosen, standing as it does by the roadside it is easily seen; it has also the further advantage that it is passed daily by men interested in cotton on their way to the mills.

Interest in the farm is even now far greater than at either Bellary or Hagari and consequently its effect on the surrounding district is likely to become much greater in the near future. The visit of six Tahsildars of neighbouring taluks with some 200 ryots is worthy of mention. As a result, applications were received on the spot for supply of cotton seed to the extent of 384 maunds and later the Assistant Farm Manager received further applications.

28. This year an area of land, 45 acres in extent, was rented at Natla Kothur; about 20 acres of this land was waste land and infected with nut grass (*Cyperus rotundus*). This was ploughed up with the C.S. plough. The remainder received ordinary treatment. The results of deep ploughing are not marked in the same year as the operation is performed, and the yield from this part was not so heavy as from the rest of the field being 150 as compared with 263.

29. With the assistance of the Diwan of Banganapalle State, to whom thanks are due, four influential ryots in four different villages were found willing to grow farm seed under the instructions of the farm officers. They were supplied with seed and 75 acres were sown down. The yields were not exceptional save in one case, where a yield of 475 lbs. per acre was obtained.

30. Depots will be opened at Banganapalle and Koilkuntla and fresh ground broken by the establishment of two more seed farms. Later, the district north of Nandyal will be attacked and it is hoped that before very long the whole of the Nandyal valley will have been brought into touch with the farm. Over 3,000 lbs. of seed were distributed.

31. Demonstrations of the C.S. plough were held and both the Assistant Farm Managers toured in the villages in connection with this work. Seven applications for this plough were complied with and more applications have been received.

32. Six ryots were induced to try the experiment of single transplanting of paddy seedling and the future extension of this work seems hopeful. In order to bring this system more prominently to the notice of the ryots, a plot situated in a prominent position in the town has been rented and comparative plots will be laid down.

33 The farm was in charge of Farm Manager Raghunatha Rao for three months and Assistant Farm Manager Narayan Aiyangar for the remainder of the year.

The Bezwada Agricultural Station.

34. No scientific report has been issued this year for this farm.

As the farm has only recently been handed over to the department, sufficient time has not elapsed for the acquisition of a thorough knowledge of the local methods of cultivation and of the climatic conditions governing these practices. Hence it has been difficult in the first place to devise experiments and secondly, owing to an unfavourable season, most of the experiments have failed.

The remarks made at the beginning of last year's report still hold good. The farm on the Ellore canal side is flanked by a village, the inhabitants of which, are in the habit of grazing their live-stock on the farm crops, this practice considerably affects the yields of the crops under investigation, and under such circumstances the accuracy of conclusions drawn from experiments which have undergone such treatment may well be doubted.

The season, as marked above, was unfavourable and was marked by short late rains, only ·71 inch being recorded during the last three months of the calendar year, instead of the normal 8 inches expected. This told very heavily on the late sown (paira) crops while even the mid season crops were much reduced in yield.

35. *Crops.*—The crops grown include most of the local crops, jonna (*Sorghum*), sazza (*Pennisetum typhoideum*), cotton, Bengal gram (*Cicer arietinum*), and candi (*Cajanus indicus*). The most noteworthy result to be recorded was the splendid yield of the introduced varieties of sazza from South Africa, Transvaal and Lowveldt, which gave 1,656 and 1,640 lbs. per acre off plots ½ acre as compared with 946 lbs. obtained from the local variety. This crop certainly seems to have a future in the district and, with the exception, perhaps, of Cambodia cotton, is the only promising line of work the farm offers.

Cambodia cotton has done well again this year. Expert opinion on Cambodia showed that the cotton is of excellent quality and of the type required. The yield last year was 210 lbs. per acre which ginned to 69 lbs. of kappas sold at Rs. 175 per candy, a return of Rs. 24 per acre. The percentage is high, viz., 33 per cent. as against 22·7 of local cotton.

This year nearly 500 lbs. per acre has been already gathered. The local cotton is superior in point of yield and has already given nearly 700 lbs. Picking is not yet over and discussion is deferred until ginning has been completed.

The experiment is interesting, and careful selection with the aim of producing a more compact plant should prove effective. The plant is handsome and the bolls are very attractive.

The grass is still very troublesome; in order to eradicate this pest the '*yegili*' system (fallow ploughing through the growing season and taking a late crop of Bengal gram) was tried with favourable effect. Deep ploughing was continued in other plots with marked success: the land is naturally fertile and with the eradication of the grass will yield good crops. The Farm Manager reports that the farm crops grow better than the local crops.

Exotic maizes, Hickory King and Brazilian flour corn, were a failure owing to the weedy nature of the land, and to the attacks of white-ants and jackals, the last named being especially troublesome. Seed has, however, been gathered, and, in view of the importance of this crop in parts of the Kistna delta, the experiment will be continued.

36. Smut experiments were also carried on, though not to such an extent as on the other farms. The copper sulphate treatment was perfectly successful and no smutted heads were seen, while untreated plots on both sides were affected.

The experiment to test the effect of sowing sorghum mixed with pulses was again unsuccessful; the pulses as in the previous year having all failed.

Thin as against thick sowing of sorghum was tried; the results show that thick sowing on these fertile lands, is, if the rainfall is insufficient, better than thin sowing, as thin fodder is produced while no reduction in the yield of grain is noted.

37. As a means of influencing the ryots this farm is behind all the others. In this respect its situation is most unfavourable; it is hidden for the most part between two embankments, and instead of being so placed as to be patent to all eyes, has to be looked for.

The number of visitors is very small, though the Tahsildars have all been circularised by the Collector.

38. Farm Manager L. Natesa Aiyar continued in charge, with the exception of two months' leave until December when he was deputed to patti-mannu work. Farm Manager S. Raghunatha Rao continued in charge from that date.

The Samalkota Agricultural Station.

39. The season was on the whole favourable; the heavy fall in April was of great assistance to the young canes, enabling them to get a good start.

The presence of 'Red rot' has unfortunately to be recorded on the farm itself in the close vicinity, and in the upland nursery. The attack is, however, slight and with proper care ought to be kept well within bounds, if not entirely eradicated.

In the nursery the plants did not thrive as well as expected. This was due in all probability to the land being poorer than the farm land. Part of this area has been given up and a fresh portion obtained and planted out with new seedling canes, two of which were but lately received from Barbados.

40. The results obtained this year from the cultural and manurial experiments are fairly conclusive. In the case of the cultural experiments, a comparison of the flat bed system of planting with shallow trenching shows that once the ryot has been persuaded to adopt planting in rows, the department has little else at present to teach him on that side of the question.

The results of the manurial experiment show that, while the application of lime has a favourable effect on the purity of juice, it affects adversely the yield of jaggery. With regard to the other manures, none have been found to give as good yields as castor-cake. A full discussion of these experiments will be found in the Scientific Report.

41. The demand this year for canes, *i.e.*, B. 208 (as hardly any other variety was asked for) was far in excess of the supply, and many more canes could have been disposed of had they been available. One hundred and twenty-one applications, mostly from the surrounding district, were complied with, and 14,150 canes were distributed of which only 1,100 were other than B. 208. Numbers of applicants who would gladly have paid a higher price than the department was asking had to be turned away disappointed. An offer of Rs. 70 was received for the plot cultivated under the share system and holding some 1,700 canes, but had to be refused as the applicants were all inhabitants of one village.

42. The paddy experiments also gave good results. The manurial experiments, while showing that more work requires to be done on this important question, give some indication of how and when this crop ought to be manured. The results of the cultural experiments indicate the great economy that may be gained and the benefits that may be derived from adopting the system of transplanting paddy seedlings singly and at fairly wide intervals.

The amount of seed required to plant an acre on the farm varies from six to eighteen pounds, which is in marked contrast to that noted by the Deputy Director while touring in the Vizagapatam district, viz., 140 lb. It is also worthy of note that by selecting seed from singly transplanted plants and sowing it again in the same manner a strain of seed is being evolved which will produce plants able to take full advantage of increased spacing.

The optimum distance at which seedlings ought to be transplanted has not yet been determined, but once the plants have become accustomed to the new conditions of cultivation this ought to be arrived at without much trouble.

43. Another failure has to be recorded against Bengal jute which is evidently unsuited to the district.

44. The experiments with turmeric show that local methods and local seed are preferable to Nandyal methods and seed.

45. Farm Manager Balakrishnamurthi continued in charge till the 13th of May when he received two months' privilege leave; on his return he was transferred to Central farm, Coimbatore, *vice* Farm Manager Rajagopalachari who had been transferred to this farm. The latter continued in charge till the 5th November when he left on sick leave. Assistant Farm Manager N. Sitaramaswami Nayudu continued throughout.

Assistant Farm Manager S. Subbiah in charge of seed selection work was transferred to Koilpatti and Assistant Farm Manager V. S. Narayanaswami Aiyar transferred from Palur to take his place.

Assistant Farm Manager A. Peterson was appointed as touring assistant to the Deputy Director of Agriculture on 1st August. He continued for two months when he was transferred to Samalkota where he continued till the end of the year.

The Hindupur Station.

46. As the cultivation of the aloe plant as a fibre crop is becoming of increasing importance, year by year, a summary of the work done in connection with this station may not be amiss.

47. In 1898, 3,000 plants of *Agave Sisalana* were distributed to the Collectors of Bellary, Anantapur, Salem, North Arcot, Cuddapah, Nellore, Coimbatore and Madura for cultivation. Most of these plants failed. It was then determined (1900) that an experiment under proper control and supervision should be started; accordingly in 1901–1902 a small area of land, situated about one mile from Hindupur railway station and bordering on the railway track, was taken up. This was planted as follows :—

Agave rigida var. Sisalana	6,225 plants.
„ Americana	6,325 „
„ Vivipara	15,920 „
Furcroea gigantea	504 „

The plants of the first-named variety were obtained from Madras, Bangalore and Poona, those of the third-named from Dharwar; where the others were obtained is not stated. Of these plants, 4,800 died; the remainder established themselves. During the next three years little was done save to allow the plants to grow. It is reported that the year 1902–1903 was marked by heavy rainfall, which killed off 200 plants of *vivipara* and caused the appearance of disease amongst the "sisal" plants. The disease took the form of withering of the tips of the leaves; this, however, disappeared and the plants thereafter did well. As a set off against the loss of plants by death the appearance of 500 suckers was reported. In 1904–1905 the plots were weeded and grasses removed to obviate loss from fire.

48. The following year, 1905–1906, the plot was examined with the idea of starting experiments to test—

(1) Effect of clearing as compared with leaving to nature.

(2) Drainage as compared with non-drainage.

(3) Shade as compared with full exposure to the sun.

But as there was no shade and natural drainage was good and the plot had just been cleared, these ideas had to be abandoned and all that could be done was to portion off part to be left to its own resources for comparison with the part kept cleared. The yield of fibre was tested and it was found that 362 plants yielded 4,579 leaves containing 3 per cent. of fibre. The cost of production was, however, very heavy, being as much as £28 per ton. In 1906–1907 it was noted for the first time that some plants had poled.

49. Next year, 1907–1908, fibre from the three varieties *Sisalana*, *Americana and Furcræa gigantea* was sent to the Imperial Institute for valuation. Reference to that report shows that the fibres obtained compare favourably with foreign fibre. *Sisalana* was the best and produces 3 per cent. of fibre. *Americana* was next, the percentage of fibre in this plant varies from 1·4 per cent. *Furcræa* was least valuable and the percentage is small, being as low as ·34 per cent. Two cuttings were made—one in May and one in October. The yields were as follows:—

	Leaves.	Fibre. lb.
May	16,517	495
October	3,532	105

50. Last year the work was extended. A fresh plot was laid out on the southern side of and at a distance of half-a-mile from the railway. This was planted up with '*Sisalana*' and three experiments were devised to compare—

(1) Trimming old roots and lower leaves before planting with planting untrimmed.

(2) Flat bed planting with ridges.

(3) Big plants with little.

As pointed out in last year's report the results of these experiments were in favour of (1) planting untrimmed, but it was doubted whether the plants had not been too severely trimmed, (2) planting out in ridges, (3) planting big plants up to a certain point.

51. Besides this, another small area, 2 acres, at Somandapalle was planted out with 2,000 suckers of '*Sisalana*'. The intention as regards this area is to leave the plants to grow in a natural manner in order to test just how little attention this plant can do with. The yields obtained last year were at the rate of 430 lb. The number of poled plants up to 1908–1909 was 80. At the present date the arrangement of this experiment is as follows:—

(*a*) The old plantation divided up into eleven plots—

Plot 1. Unoccupied.

„ 2. Nursery planted with suckers and bulbils of *Sisalana*.

„ 3. Planted out in nine rows with *Sisalana* from North Arcot.

„ 4. Do. do. Madras.

„ 5. Do. 11 rows with *Furcræa*, small portions of the plot utilised as nursery.

„ 6. 40 rows of 'sisal'. Outside seven, non-experimental, the next nine experimental, remainder non-experimental.

„ 7. Four rows of 'sisal' from Vellore Jail.

„ 8. Sisal from Madras and Banagalore planted in 1901–1902. Forty-eight rows.

„ 9 Do. Poona planted in 1901–1902. Sixteen rows.

„ 10. *Americana* planted in 1901–1902.

„ 11. *Vivipara* planted in 1901–1902. This was abandoned but now shows signs of reviving.

Two cuttings were taken from the nine experimental rows in plot 5 this year—one in September and one in January. The yields of leaf per row are given below, also the weight of fibre calculated assuming that 100 lb. of leaf gave 3½ lb. of fibre. No fibre was actually extracted.

	Fibre per acre. lb.	September.	January.
1	319	212	160
2	203	148	96
3	188	124	101
4	305	224	141
5	199	154	81
6	200	159	80
7	203	110	133
8	272	216	109
9	282	195	142

(*b*) New plantation, south of the railway, already described. The untrimmed plants continue to do better than the trimmed, the big plants better than the little, and those planted in ridges better than those planted in flat beds. Seventy-six of the plants have died.

(*c*) Area at Somandapalle already described.

52. Some fungus disease appeared in the old plantation in plots 3, 4 and 6; but the attack was not serious, and the affected leaves were cut and burnt. The plants in all the plots seem to be nearing the poling stage. The number noted this year in plot 3 is twenty-five; in plot 6, sixty-nine, in plot 7, seven; and in plot 9, two. No plants poled this year in plot 5, and in plot 10, *Agave Americana*, none have poled since this plot was planted.

53. The expenditure this year has simply been the pay of the watchman, with the cost of a cooly in September to aid in cutting the leaves.

BELLARY,
21*st May* 1910.

G. R. HILSON,
Deputy Director of Agriculture, Northern Division.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, SOUTHERN DIVISION.

In submitting the administration reports of the Agricultural stations which have been under my charge throughout the year under review, I have the honour to draw your attention to the following District work which has been done in the Southern Division.

2. Farm Manager, C. Narayana Aiyar, has been on special duty in the Tanjore delta throughout the period, except for 48 days when he was temporarily transferred to the Northern Division. He has now completed his tours of agricultural enquiry in the Mannárgudi and Nannilam taluks. In addition to this, he has done much work in bringing improvements recommended by the department to the notice of the ryot, notably single seedling planting of paddy and the cultivation of green manure crops on the wet lands. Regarding the latter improvement he has sold about 39 bags of indigo seed which is sufficient to sow about 957 acres, 20 bags of kolingi sufficient to sow about 250 acres and 13½ bags of sunnhemp seed sufficient to sow about 88 acres and he has distributed seed of new varieties of maize to several selected cultivators in the Mannárgudi taluk. There is now a possibility of largely extending the practice of green manuring and there is no doubt that in time the supply of seeds will be taken up by merchants locally.

3. Demonstrations have been held showing the value of the Archimedian screw for lifting water at low lifts, and the sale of improved ploughs for Messrs. Massey & Co. has been taken up with a view to showing this firm that there is a sufficiently large demand for these, to warrant their starting their own agencies in the delta. Recently this Manager has been so fully employed in giving advice and assistance to those who are trying improvements that the original object of his enquiry has rather been lost sight of.

4. In Tinnevelly the work of cotton improvement has assumed much larger dimensions. The registers from the 37 seed depots show that over 140,000 lb. of seed was sold and an area of 15,600 acres was sown with seed supplied by the department and that 1,550 acres of land belonging to ryots situated in 49 different villages came under drill cultivation this year. In addition to this 550 acres of ryots' land situated in 16 villages was sown by the department for seed under the conditions already communicated. This work was directly under the Manager, Koilpatti Agricultural station, and two full-time Assistant Managers were on special duty under him, while one Assistant Manager was employed both on the Agricultural station and on this work at the same time.

5. In North Arcot, seed of introduced varieties of maize has been distributed to selected cultivators by whom this crop is grown.

6. Both in South Canara and Malabar, sugar-cane has been distributed to selected cultivators and assistance given at the time of planting, while ryots who grew the cane last year have been shown and taught the process of the manufacture of jaggery.

7. In conclusion I wish to draw attention to the way in which all my subordinates have worked. Some have had more arduous duties to perform than others, and it might seem that such deserve special mention, but I consider that each in his own sphere has shown an increasing interest and enthusiasm in his work which has considerably raised the standard of efficiency in the department.

I would also draw attention to the large increase in correspondence with the general public which has taken place within the last two years, as well as to the increase in departmental work, in my office, details of which have already been communicated to you. The figures show that with an establishment of only three clerks, it would have been impossible to cope with this work within office hours only.

The Palur Agricultural Station.

The season.—The summer rains and the south-west monsoon were exceptionally good this year. The former greatly benefited the green manure crops sown on the wet land, though unfortunately very heavy rain occurred just after the sugar-cane crops had been planted which destroyed many of the sets. The abundant south-west monsoon rainfall gave an exceptionally high yield of dry land cereals, though the quality was slightly damaged owing to continuous rains at harvest time. The sugar-cane further suffered from this continuous wet weather, which gave no opportunity for earthing up the plants or effecting proper drainage. The north-east monsoon completely failed; thus the rainfed groundnut crop was poor and so were the samba paddy crops. The sugar-cane benefited, however, as this gave an opportunity to drain the land.

2. *The experimental work.*—on this station has been continued on the same lines as last year. The cereal groundnut experiments seem likely to give very valuable results and have been fully discussed in the Scientific report. This year it has been possible to demonstrate some of the improvements which have been proved by experiments—notably the introduction of green manure crops and the single planting of paddy. The introduction of Mauritius sugar-cane has got beyond the bounds of demonstration as the following figures of the area under canes in the neighbourhood will show:—

	ACS.
Total area under cane	467
Area under Mauritius canes	353
Area under local canes	114
Percentage area of Mauritius canes	75·6 per cent.

Of the area under Mauritius canes 162 acres were planted by the East India Distilleries and Sugar Factory, Nellikuppam.

3. *Demonstration of improvements.*—The value of Daincha (*Sesbania aculeata*) as a green manure was demonstrated. One acre of the worst wet land on the Agricultural station was selected. The paddy crop, which followed, yielded this year 2,240 lb. whereas the same field without a green manure crop yielded only 1,292 lb. in the previous year. This and other plots where green manure crops have been tried have created considerable interest among visitors to the Agricultural station and a fairly large area, estimated at about 150 acres, in the neighbourhood has been sown with green manure and pulse crops as a result. Single seedling planting of paddy has also extended to some extent. The results reported are in favour of this method of planting and a large extension of this improvement may be expected next year. Apart from direct improvements in cultivation, large quantities of seed for sowing have been supplied from this Agricultural station. During the year over 31,000 lb. of groundnut seed, 8,000 lb. of paddy and 500 lb. of other miscellaneous seeds were supplied to applicants. In addition to the issue of seed, 3 Egyptian ploughs, (introduced by the Deputy Director of Agriculture, Sind, from Egypt and slightly modified in size to suit local requirements), 9 improved country ploughs and 22 harrows have been sold to applicants, while orders are on hand for 14 Egyptian ploughs, 17 improved country ploughs and 2 harrows. These are made by arrangement with the village carpenter and blacksmith who supply them through the Manager at definite rates. Thus every implement has to come up to standard before it is issued. The arrangement is not altogether satisfactory, since the work is often delayed as the village artisans have to give preference to village requirements. If the demand shows a likelihood of increasing it may prove more satisfactory to employ a whole time artisan to attend to this and similar work for the Agricultural station.

4. *Crops newly introduced.*—In addition to green manure crops referred to above, the following other crops are under trial and promise to be useful introductions.

Maize varieties.—Two American varieties introduced from South Africa promise to prove useful introductions. Seed of these has been distributed to selected cultivators in those parts of Tanjore and North Arcot districts where the crop is now grown.

Several varieties of paddy are under trial.—One or two short duration paddies from the Central Provinces may prove useful as first crop varieties, in places where the season or water-supply is liable to fail before the second crop is harvested. One or two second crop or samba varieties introduced from other districts seem very promising.

Cambodia Cotton, which has extended so rapidly in Tinnevelly, promises to fill a great want in this district, *i.e.*, a remunerative crop which will rotate with irrigated groundnut. It is estimated that the crop now under trial on the Agricultural station will bring in a profit of Rs. 150 per acre. This has been grown on good garden land under a well. Already some applications have been received from ryots who wish to try this in place of the irrigated groundnut crop.

5. *The Staff.*—The strength of the staff has remained the same throughout the year. One Assistant Manager was transferred to the Northern Division and his place was taken by another Assistant Manager who had been temporarily transferred to Koilpatti Agricultural Station from the West Coast, to assist during the season in the work under cotton improvement.

6. *Miscellaneous.*—An extension to the seed store has been found necessary and this is now nearing completion. One of the farm bullocks was stolen and flayed for its skin. The culprits, however, were discovered by the police and the case was dealt with in the Panruti Sub-Magistrate's Court.

The Koilpatti Agricultural Station.

Seasons.—Though the seasons have not been particularly favourable for the cotton crop, it has on the whole been very favourable to other black cotton soil crops. The hot weather rains (April and May) amounted to 6·24 inches, but these were all light showers with the exception of a heavy rain of 3·70 inches which fell in April. With the help of this rain many black soil ryots sowed red gram, which crop was further assisted by the unusual rainfall of 3·75 inches which fell in August. The same hot weather rains accompanied by cold nights and misty mornings were, however, very unfavourable to the second flush of cotton, causing flowers and young bolls to drop off. The result was that the summer picking, which the previous year continued well into July, was practically completed by the end of May.

The heavy rainfall of August was utilised for the sowing of most of the red soil crops, and thus the farm work was well advanced before the black cotton soil sowing commenced. The north-east monsoon practically failed in the tract. No general rainfall occurred, and though in most places the average amount of rain fell in the shape of thunderstorms which were sufficient for sowing, in some localities even these did not fall. From the beginning of December till the end of the year practically no rain fell; the nights were cold and the mornings dewy. These conditions were particularly favourable to both the cumbu and the pulse crops. The cumbu grain set well and the pulses are said to be the best crop for many years. This was particularly fortunate since in the previous year the crop was a complete failure. Though these weather conditions favoured these crops, they were not at all favourable to the cotton which during January and February require the moist sea breeze. A light shower in February followed by misty mornings caused flowers and bolls to drop and lessened the estimated yield of cotton by about 40 per cent. In the case of early sown crops the loss was more. In one of the seed farms near Koilpatti the yield was estimated at the end of January to be about 600 lb. of kappas per acre, but after this change in the weather the yield can only be estimated at 200 lb. The yield from 550 acres of seed farm was, at the end of January, estimated at 840 pothies, but now can only be estimated at under 500.

On the whole, the year has been distinctly favourable to cultivators in this tract. Most ryots have been able to sell cotton at Rs. 30 and over per pothi as against Rs. 19 at this time last year, which makes up to a great extent the deficiency in the yield. Their grain crops have been good while the pulses have been excellent.

2. *Crops.*—The general farm cropping has been continued, namely, a four-course rotation of cotton every other year, and cumbu and fodder cholam alternately in the intervening years. The area under Karunganni has been extended slightly in view of meeting the demand of seed for sowing in our seed farms. The seed sown was from kappas collected from selected plants which gave a percentage of lint to seed of 29·63 per cent. against 25 per cent. which is usually taken as the average of the district. Uppam cotton was grown on about 12 acres. This also shows much improvement. The lint seems longer and not quite so harsh as formerly, while the percentage of lint from the kappas selected for farm sowing was 30·46 per cent. Cotton for detailed selection was sown on an area of nearly 12 acres and a further field plant-war selection has been made of these, with the idea of obtaining further improvement in the future. These crops show this year that natural cross fertilization is much more frequent than is generally supposed, and many of the most promising selections of last year have shown themselves to be crosses and have therefore to be discarded. All the select Uppams have had to be discarded as a large proportion of each selection shows undoubted signs of the grandparent having been crossed with Karunganni. However some of the selections are now in the third generation since the original parent was selected and show no signs of cross fertilization. Those, which are worth going on with, are all better than the original parents. One has given a percentage

of lint for the last two years of over 34 per cent. while the lint of two others are pronounced to be worth 1*d.* per pound more than "F.G.F. Tinnevellies". It will be possible to sow several acres next year with some of them.

Nineteen acres of cumbu were sown this year, the whole area being sown with the drill. The crops were much better than usual and amply demonstrated to interested visitors that drill cultivation is as applicable to cereals as it is to cotton. When this fact is more fully known it will do much to assist in the work of extending the practice of drill cultivation. A similar area was under fodder cholam and similar experiments were tried with this as were tried last year.

The manurial, rotation and spacing experiments were continued. On the red soil similar demonstrations to those of last year were conducted with ragi and onions, details of which will be found in the scientific report of this station.

3. *Insect attacks.*—A severe attack of grasshopper was common throughout the south of the district and much damage was caused to young cumbu and cholam crops. Outside, cases were reported where severe damage was done to ragi and samai crops even when in ear. Large areas in the district originally sown with cereals had on this account to be ploughed up and sown with cotton. The farm crops however escaped fairly lightly. All the cholam crops were attacked but not sufficiently badly to necessitate resowing. The attack however was sufficiently serious to nullify any experiments being conducted. About 2 acres of cumbu, which was resown and again eaten off, had to be sown with Bengal gram, but otherwise little damage was noticed when the surviving crop had grown up. Bagging was tried on the farm and demonstrated in several villages. A general knowledge of this method of dealing with the pest would do much to lessen the attack another year.

Aphis also made its appearance on the Karunganni cotton, which, having a smoother leaf, is more liable to this attack than Uppam.

4. *Miscellaneous.*—A seed-store is being erected by the Public Works Department and is nearing completion. One pair of bullocks was sold and replaced by a younger pair.

The Taliparamba Agricultural Station.

The season and cropping.—This has been very favourable on the whole. The pepper flushed early, owing to the heavy cyclone in May, and the monsoon was broken with two or three periods of fine weather. September-October rains were exceptionally good, while, as usual, the latter part of the year has been hot and dry.

Sugarcane—was established before the monsoon, chiefly in February-March, with the aid of hand watering. A few canes of B. 208 from Samalkot were planted late, as well as other canes to fill up the vacant ground of this plot. As last year's canes were allowed to remain on the ground to supply demands for seed and for filling vacancies, these were also ratooned late. All the dry land crops and paddy nurseries were sown with the aid of the cyclonic rain of May and were thus well established before the monsoon broke. Transplanting of paddy and ragi was completed in June and pepper cuttings and standards were planted in their proper season.

2. *Crop results—Pepper.*—This has been an exceptionally good year on the farm. The season favoured the setting of pepper so that all vines, good and bad, yielded. The yield is the highest yet recorded, viz., 4,893 lbs. of pepper. This included a small quantity harvested from vines planted since the farm was started.

Paddy—gave an average acre yield of 941 Madras measures. The spacing methods were again demonstrated, but owing to the large proportion of chaff the yields are not comparable. One plot for example yielded 1,869 Madras measures at threshing, but contained so much chaff that the cleaned dry grain only measured 1,060 Madras measures. Even this however, is good for this class of land. Analysis of the soil seems to show that these West Coast soils cannot maintain the requirements of phosphorous and potash when green manure only is applied and this year potash is being supplied in addition to the green dressing.

Ground-nuts.—These grown on newly cleared modan land (land under fugitive cultivation) gave good crops with manuring, either with ashes, or cattle manure, or both. Without manure however the yields were poor. The yields of the several plots will be found in the scientific report. It is surprising, however, how readily this poor soil responds to even light manuring. Probably in an ordinary jungle clearing, where the scrub is burnt *in situ*, the ash thus supplied would give an excellent crop. As the line of work adopted on the agricultural station is for the permanent cultivation of this land, the scrub was rooted out and removed and hence this has not been tested.

Ginger—following groundnuts, on similar land to the above, promises to be a most paying crop. A plot, 4·30 cents in area, yielded 556 lb. of green ginger, valued at the local price at about Rs. 34. This works out roughly to Rs. 800 per acre, the cultivation expenses were Rs. 145 per acre. The method of cultivation was that of South Malabar. This has attracted

some attention locally and it is stated that three or four persons, who saw the crop, have, on their own initiative, imported rhizomes from South Malabar for planting this next year. The main difference between the local and the South Malabar method is that, in the latter, they plant with the showers before the monsoon while in the North Malabar and South Canara they plant only on the burst of the monsoon. This late planting may also account for the prevalence of the disease in the South Canara crop since good drainage is an absolute essential to the crop. I have been informed that the disease is, on occasions, so severe that the cultivation has become greatly restricted.

Ragi—following ground-nuts and manured with six bandy-loads of cattl emanure and two of ashes gave an average acre yield of 1,240 lb. Considering that only 16 cents were grown with this and that it was subject to the attack of bandicoots, rats, etc. the yield is encouraging.

Modan paddy—on a similarly small scale almost failed on account of these pests. As the area now available for trial of these cereals after groundnuts is much larger, it is hoped that it will be possible to protect these crops better, Cassava, onions and maize were also tried but with little success. The soil proved too loose for onions, maize flowered before the rains were well over and thus failed to set its grain properly, while the cassava did not grow well and what did grow fell a prey to porcupine.

Guinea grass—seems at last to have found suitable conditions, under which it will thrive and pay for its cultivation. This does exceedingly well on this modan land provided that it is manured annually. When seen in February, it was still growing vigorously and was greedily grazed by cattle. Of the other indigenous grasses, those mentioned in previous reports can still be recommended in that they continue to grow or at any rate remain green throughout the year.

Sugarcane.—The Mauritius varieties introduced in 1907 give excellent crops. It was calculated this year that the yield from "plant" canes was as much as 26 candies of jaggery per acre, while that of "ratoon" canes was almost as high being 23 candies. The B. 208 introduced this year from Samalkot gives promise of being admirably adapted to the West Coast. So far it has retained its habit of being a thick, short, sturdy cane and it ripens better than the Mauritius varieties. Large quantities of Mauritius cane sets have been distributed in the sugarcane tracts of South Canara and also in Malabar, especially in the neighbourhood of the farm, where many ryots have substituted this for a portion of their plantain gardens. Photographs of canes grown at this agricultural station will be seen in the Scientific Report.

Green manure crops.—Trials with field cow-gram and ground-nuts as green manure crops are most promising. Space is not available however to test accurately the increase in yield and though the plot yields show that the outturn has been doubled, the results may not be quite as high as this when grown on plots of the same known fertility.

3. *Staff and touring.*—The sanctioned staff of a Manager and two Assistant Managers were stationed here till the heaviest work of the year was over, when one of the Assistant Managers was transferred to Tinnevelly where there was heavy work under cotton improvement. The manager toured chiefly in the Ponnáni and Chirakkal taluks of Malabar as well as in the Coondapoor division of South Canara. He spent 110 days on tour in Malabar and 65 in South Canara and also visited the Central Agricultural Station at Coimbatore. There is no doubt that his constant touring is doing much to awaken and maintain the interest taken in agricultural improvement.

The Assistant Manager has toured mainly within the neighbourhood of the farm.

The staff of the station have all worked satisfactorily and it is hoped that in the near future some of the heavy touring of the manager will be taken off his hands.

4. *Miscelldneous.*—Special interest has been taken by visitors in the sugarcane, ground-nut and ginger crops. Green manuring has attracted some local attention, but to see the benefit of this, both the green manure crop and the subsequent paddy crop must be seen. In spite of the inaccessibility of this agricultural station, the number of visitors who take an interest in the practical side of the work is constantly increasing. These represent all parts of the two West Coast districts. The acting Imperial Mycologist visited the agricultural station after inspecting the pepper crops of the Wynaad, but his final report as to whether the Wynaad pepper disease is the same as the disease on the agricultural station, has not yet come to hand. New quarters are being erected for an Assistant Manager, which, it is expected, will be completed before the monsoon breaks.

TRICHINOPOLY,
6th May 1910.

H. C. SAMPSON,
Deputy Director of Agriculture, Southern Division.

APPENDIX II.

REPORT ON THE COLLEGE OF AGRICULTURE AND RESEARCH INSTITUTE AND THE CENTRAL FARM, COIMBATORE, FOR THE YEAR 1909-1910.

The College was formally opened on the 14th July by His Excellency Sir Arthur Lawley, who was accompanied by Lady Lawley. It will be remembered that His Excellency Sir Arthur Lawley, who has taken the greatest interest in the work of the Department, laid the foundation stone on the 24th September 1906. The whole of the constructional work has been finished, and all the rooms occupied by the experts to whom they have been allotted. A certain amount of rearrangement of the original distribution has been found necessary; the Museum, for instance, is to be located on the east of the main entrance, instead of upstairs in the rear block, where the Entomological section now finds quarters. The arrival of the Mycologist in January has completed the staff at present sanctioned, and he has taken possession of his rooms though they are at present unfurnished. The Botanist and the Mycologist occupy the whole of the front block upstairs, the upper story of the rear block containing the Biological teaching rooms, with lecture and assistants' rooms. Downstairs the Agricultural Chemist occupies the whole of the rear block, while the front block is shared by the Principal, the Physics section and various preparation rooms. Besides the Mycologist's rooms—the Library, the Principal's room and some of the Government Botanist's rooms still remain to be furnished. The appearance of the College will be greatly improved by the handsome compound wall now being built by the Public Works Department.

The lighting scheme is at present under consideration by Government. The water-supply is still dependent on two hand pumps, but it is hoped that the permanent installation which has received the sanction of Government will shortly be erected. The same installation will also supply the native officers' quarters and the students' hostels, to many of which water has now to be supplied by cart at considerable inconvenience. All types of quarters were practically fully occupied during the year, and further additions to the staff will necessitate the construction of additional quarters. The general appearance of the quarters and the College maidan has been improved and as soon as the drainage works now being constructed by the Department of the Public Works are finished, the work of clearing and tidying round the sites can be properly taken up. The main water-supply being reserved wholly for drinking and washing, water for tree-planting will be partially supplied by a masonry channel running from the farm well past the rest-house and the line of quarters on the west of the maidan.

The Post office has been finished and is now occupied by the Postmaster, thus setting free two quarters and the workshop for use by the farm.

Plans for a rest-house for Indian visitors have been scrutinised and a site suggested. It will face the maidan, and accommodate three visitors at a time.

Visitors.—Besides the ordinary Coimbatore sightseer, who regards the College as a pleasant object for an afternoon's walk for himself and his family, the College has been visited by the Commissioner twice; the Director of Agriculture on five occasions; Mr. S. D. Bowden of the Industrial Exhibition Station, Ongole; M.R Ry. H. V. Nanjundayya, Member of His Highness the Maharaja's Council, Mysore; the Raja of Kollengode; the Poligar of Uttukuli; the Zamindars of Singampatti and Chennappanayakampalayam; M.R.Ry. Rao Bahadur Hanumantha Gowd (the last five all Honorary Visitors); the Court of Wards, who stopped two days; and many others more or less interested in Agricultural or other Scientific training.

Students.—There are at present under instruction in the College, eighteen students who have completed two years of their course, and thirteen who completed one year. The deficiency in numbers is regrettable, but is due to students leaving during the course or being found unsuitable. It is not possible to make up the numbers either by drafting in students during the course or by admitting more students in the following year, as there is accommodation in the laboratories for only twenty.

Applications for admission continue to increase, 144 having been received during the present year. Many of them were however from failed Matriculates, who with remarkable unanimity discovered that Agriculture was the subject they had been wanting to take up for years.

District.	Number.	Caste.
Coorg	1	Coorg.
	1	Vakkiliya.
Tanjore	1	Brahmin.
	1	Balija.

District.	Number.	Caste.
Trichinopoly	1	Mahomedan.
Madura	1	Brahmin.
Salem	1	Brahmin.
Malabar	1	Nair.
	1	Samandha.
South Canara	1	Christian.
Cochin	1	Brahmin.
Mysore	1	Brahmin.
	1	Vaisya.
Gódávari	1	Brahmin.
Ganjám	1	Do.
	1	Uriya Brahmin.
Kistna	1	Brahmin.
	1	Kammavara.
	1	Kshatriya.
Vizagapatam	1	Brahmin.

Terms.—Last year's work commenced in May instead of in June, owing to the early closure of the college on account of plague, and there was a continuous term from then until December 17th with a single week's vacation in September. This was felt to be too long, and though it was exceptional, it has been proposed to open earlier and have one month's vacation in September. Among other advantages, this will, as pointed out by Deputy Director of Agriculture, Southern division, enable the students to see something of their own crops at home, which in view of the ignorance most of them have when they arrive, is most desirable. Government orders on this proposal are awaited.

Work—Agriculture.—The second year have attended a course of lectures on agriculture delivered by the Principal and have put in three 3-hour practical classes a week, two in the morning and one in the afternoon. During this time they have completely cultivated their own $\frac{1}{4}$ acre plots of cotton, cholam and Bengal gram, with the exception of the operations necessary while they were away. They have also fully joined in the work of the farm, and have performed every farm operation. There are naturally great differences in the quality of the work they do, but though there has been grumbling at the arduous nature of the tasks they are set, yet the class as a whole realise the importance of this field work. There is certainly no prospect of the present staff countenancing any reduction in it. The first year are superior to the second year in their field work but inferior in their class and laboratory work. They are in fact better material to start with, but will not benefit so much by the instruction given them during their stay here. Both years they were examined *viva voce* in agriculture by the Deputy Directors in July last, and again in December the Deputy Director of Agriculture, Southern division, examined those students whom he had not examined before. Certain recommendations as to the methods of teaching, and the directions in which the students were deficient were discussed by the Director and the whole of the staff, and certain important suggestions for the training of the students were made, which are being given effect to, so far as circumstances permit.

Botany.—There were two classes in Botany during the year—

(1) *Elementary Botany.*—Thirty-five lectures were delivered and 65 practical classes were held. The subject was treated in an elementary manner, special stress being laid on such parts as would enable the students to understand the living processes going on in plants and to prepare them for the succeeding course in Agricultural Botany. Some importance was attached in the course to plant physiology, and simple experiments were done in class, but in the absence of the full equipment of the laboratory the more elaborate ones were unavoidably omitted.

(2) *Agricultural Botany.*—Sixty-eight lectures were given and 102 practical classes held. The general principles underlying the life and character of cultivated plants were dealt with. Some attention was paid to the processes of horticulture and arboriculture and the more important crops of the Presidency were examined in some detail.

Entomology.—There were two classes in Entomology during the year—

(1) *First year.*—Twenty-five classes were held in which more than half the time was spent in the field. The students were taught to observe and collect insects in the field. Lectures were given on the characters and metamorphosis of insects and their classification into orders.

(2) *Second year.*—Thirty-one classes were held. The teaching was of a more practical character, special crop pests were studied and the chief remedial measures demonstrated.

Chemistry.—The new laboratories having been occupied early in the year 1909, the students were able to go through the course of studies in General Chemistry without the disadvantages attendant on the previous year's work.

General Theoretical Chemistry.—One hundred and one lectures were given in General Theoretical Chemistry and whenever possible they were illustrated by means of experiments. One hundred and four classes in Practical Chemistry of three hours' duration each were held, the course of studies being similar to the outline given in last year's report. The number of experiments dealing with the physical properties and the mechanical composition of soil were

however increased in number so as to cover a wider field. The lectures in Agricultural Chemistry were 68 in number and dealt with such subjects as plant and animal life, manures and manuring, the formation and chemical and physical properties of soil, crops, the feeding of animals, and dairy chemistry.

Examinations.—The examination for the Diploma in Chemistry, Botany and Entomology was held at the close of the last term, at the end of the second year of the course. It was decided that this arrangement would be better than to hold the complete examination in all subjects at the end of the three full years, as the students could then devote their whole attention to the advanced agricultural work of their last year. The deputation of Mr. Leake, the Economical Botanist of the United Provinces and Mr. Warth, the Agricultural Chemist in Burma, permitted of the formation of a Board of Examiners in Agricultural Botany and Agricultural Chemistry respectively. The examination in Entomology was held by the First Assistant. In considering the work of each student, not only his position in the Diploma Examination, but also his work during the previous years as shown by his note books and attendance was considered. As a result four students were held to have failed. Two of these will not be permitted to return: the other two will be allowed to sit again next year in the subject in which they have failed and, if successful, will be eligible for the Diploma.

Students' Club.—The Students' Athletic Club which was affiliated to the Officers' Club, for purposes of games, has during the year developed into a General Students' Club and has absorbed the Students' Association while at the same time severing all connexion with the Officers' Club. It is thus completely independent and has taken control of the Reading Room in the College. Membership is compulsory, and the subscription is Rs. 2 each term which will cover all the expenditure in the Athletic and Literary branches, though the purchase of all the outfit necessary for hockey, foot-ball, cricket, tennis and badminton necessary at the starting of the Club has been a severe drain on the Club funds. Several members of the Department and Honorary Visitors have kindly subscribed, and the thanks of the Club are due to them. Friendly cricket matches were played against Coimbatore, and the visit of the Court of Wards referred to above was taken advantage of, for tennis and cricket matches. The first year students are extremely keen on all games and it is considered desirable to encourage fully this side of College life, since the post of Gymnastic Instructor has been abolished.

The Honorary post of Warden has been held by M.R.Ry. Ramaswami Sivan, First Assistant to the Agricultural Chemist, during the year and he has spent much of his spare time in attending to the comfort of the students. At his suggestion, proposals are now under consideration to form messes for the different classes of students, since the servant difficulty has caused a good deal of trouble to some of the less wealthy students The responsibilities as well as the actual work of the Warden will increase next year, and a proposal to allow him free quarters as some recognition of this, is now under consideration.

A Co-operative Society for the sale of stores, grain and other produce was opened in September 1909, in quarters lent by the Principal, and immediately secured the support of the whole of the settlement. Formerly it had been impossible to procure anything nearer than Coimbatore, and even the students had to go in to the town for everything they needed. The store was thus fulfilling a most useful purpose, but it has unfortunately been ruled that no Government servant drawing more than Rs. 35 may become a member of a Co-operative Society of this nature. The matter, it is understood, is still pending the final orders of Government.

The Farm.—The season has been extremely favourable, and with the exception of the wheat crop, bumper harvests have been generally obtained. The system of farming adopted was adapted to the needs of the students as far as possible while experiments, cultural, manurial, and varietal were carefully conducted on the most important crops.

The green manuring of paddy, and the effect of reducing the seed rate both in the seed-bed and at the time of transplanting have been carefully noted and will lead, it is hoped, to economies in the cultivation of this crop. There is an indication, which needs verification, of the value of fish manure as a manure for paddy, which if true will open up great possibilities. Even artificial manure such as sodium nitrate, it seems possible to use with profit, though it is too early to speak definitely. A certain amount of information has accumulated with regard to the transplantation of other crops than paddy, which may have an effect on the methods of cultivation. The irrigation of crops in the ridge and furrow system again showed not only economy of water, but an increase in the yield, and this system will be more widely introduced on the farm. The drill system of sowing cotton has not yet met with the success attained in Tinnevelly, as the yields have been less each year than when drilled in the ordinary way. The cultivation of ground-nut was not attended with success. The attempt to grow sugar-cane on dry land was discontinued; the wet land cane was only moderate; it included the trial of several new varieties sent from Samalkota, as well as manurial and planting experiments. The problem to be faced here, is to get a full stand of canes from a smaller number of sets than is used at present. The R.I.S. plough continues to be the most useful foreign implement on the farm and, provided the land is clean, its use is to be recommended. It has been lent to a neighbouring farmer during the year. Many of the other implements though indispensable for experimental work are not such as can be recommended for purchase by the ryot. The winnowing machine is a possible exception to this, and if it could be made cheaply should command a ready sale. The number of cattle continues to

increase by births on the farm and purchase from outside. The future stock of working cattle will be furnished by the calves from the Kangayam cows by the stud bull of that breed, who is showing himself a good stock-getter. A separate dairy herd will be kept for the needs of the dairy and for the supply of milk to the staff. The cattle are at present suffering from a bad attack of foot and mouth disease, and though only one calf has died, it causes great loss by putting all the farm cattle out of action for at least a fortnight, while the cows attacked tend to go dry.

A series of feeding experiments have been commenced and will be continued as they should yield valuable results in a little known field. Some forest hay, as sold by the Forest Department, was tested against ragi straw and was found to be little inferior, while a comparison of cholam and paddy straw seems to show that the poor value generally put on the latter is not altogether correct.

A great deal of levelling, draining, building and road-making has been carried out during the year and more remains yet to do. There is now one central steading for the whole area, where formerly there were four or five, and this has necessitated a good deal of rearrangement of roads and fields. The arrangements for storing grain have been much improved by a new drying floor constructed so that it opens directly from the store rooms. Three of the wells have been cleared of silt and one permanently improved. The staff has been increased during the year but is barely able to cope with the work. At present there is an Assistant Farm Manager for each block, with one in reserve for touring work and for relieving any one who takes leave. The Farm Manager supervises the work of all, and with the Office Manager, the store-keeper, the Farm clerk, and the Mechanic, are responsible for the whole of the work of the farm. The Veterinary Assistant is in general charge of the cattle and the Engineering Assistant is in expert charge of all constructional work done departmentally, besides carrying out tests of implements and machinery, on which the opinion of the department is requested.

The financial position of the farm it may be interesting to consider. The total expenditure on the farm was Rs. 41,000 made up of Rs. 5,300 on salaries, and Rs. 35,700 on farm expenses. Nearly Rs. 4,000 have been spent in the purchase of cattle and plant and another Rs. 4,000 in new works, both of which are capital charges, while Rs. 4,000 went to the Botanical garden. The receipts have amounted to nearly Rs. 23,000, a figure which is satisfactory and which is accounted for by the favourable season.

COIMBATORE,
18*th May* 1910.

R. C. WOOD,
Principal and Superintendent.

APPENDIX III.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST, 1909–1910.

I have the honour to forward the annual report of this office for the year 1909–1910.

2. During the year the main work was the settling of the various sections and their collections into their respective rooms in the Agricultural College at Coimbatore. Much of the furnishing has still to be done and a considerable quantity of apparatus has not yet been received, but the Assistants are now in full work and the teaching section is accommodated in the fine new laboratory.

3. *Changes in staff, leave, etc.*—The staff of the Government Botanist was strengthened by the addition of M.R.Ry. K. Ranga Chari, M.A., L.T., Acting First Assistant in the Teachers' College at Saidapet, who was transferred to Coimbatore on 14th October for a period of five years in connection with the teaching work. A Third Assistant in Entomology having been sanctioned, M.R.Ry. Padmanabha Aiyar, M.A., was appointed on April 10th and after a month's preliminary work at Coimbatore was sent to Pusa for training under the Imperial Entomologist.

A considerable amount of leave, largely on medical certificate, was enjoyed by the staff during the year, and all the menial subordinate staff left the office in preference to removing to Coimbatore from Madras. The Assistant in Systematic Botany was engaged in Madras in sending off the collections until June 6th when, on his transfer to Coimbatore, he obtained leave on medical certificate and did not return to duty during the year. The second Plant Collector and Artist were each absent for a period of three months, the third Plant Collector and second clerk were absent for five and three months, respectively, on loss of pay, besides which many minor periods of leave have been granted.

4. *Work of the Government Botanist.*—During the earlier part of the year much of the actual teaching fell on the assistant in Economic Botany, the Government Botanist preparing the lectures and supervising the practical classes. This left some time for research. A detailed study was commenced of the cottons of the Presidency and some progress was made towards laying down a series of experiments for their improvement. But upon receipt of instructions to that effect, the whole of the teaching passed directly under the Government Botanist's control and research became impossible. The teaching during the year has been very exacting. The term commenced on May 1st and was continued almost uninterruptedly until the examinations at the end of March. Two new courses in Botany were prepared and an elementary course in Zoology

was supervised. In Elementary Botany 35 lectures were delivered with 65 practical classes, while in Agricultural Botany 68 lectures were given and 102 practical classes held. Great difficulty was experienced in both these courses in adapting the teaching to Indian conditions and English text-books were found to be of little value. After the commencement of the teaching practically no touring was done. The Government Botanist was away from head-quarters for 36 days during the year, chiefly in studying the cotton crops at Bellary, Hagari and Nandyal farms.

5. *Systematic Botany.*—Owing to the continued absence of the Assistant, M.R.Ry. C. Tadulingam, and the impossibility of replacing him, work in this section was largely confined to keeping the herbarium in order. Arrangements made for the compilation of a flora of Madras by Dr. Cooke at Kew had to be given up because of the old age of that gentleman. The advent of M.R.Ry. K. Ranga Chari, however, has greatly strengthened reference work in this section because of his great knowledge of the Madras flora. While only 41 sheets were added to the collection, 164 species were named for various enquirers, chiefly Professor Fyson (86 numbers), the Deputy Director Northern Division (36 numbers, chiefly grasses) and Mr. Anstead (35 numbers, chiefly leguminous plants). The set of plants placed on one side during recent years for the Calcutta Herbarium received some attention and 600 sheets were written on and prepared for despatch, while 200 sheets collected by the Government Botanist were finally identified and placed in their cases.

6. *Economic Botany.*—Work in this section has had many vicissitudes during the year. As stated already considerable attention was devoted at the commencement to the cottons of the Presidency. During the latter part of the year this work has been placed in the hands of the (now) Second Assistant in Economic Botany, M.R.Ry. T. S. Venkataraman, whose enthusiasm and hard work deserve every commendation Two series of plots, several hundred in number, were studied during the year. Crosses were made between two forms of the indicum, herbaceum and hirsutum types, with the idea of ultimately improving the Karunganni, Bourbon and Uppam cottons in Madras. Marked attention was paid as usual to Cambodia, a form which seems to be of great promise. Altogether 700 flowers were crossed and about 2,000 flowers were selfed during the year.

Similar work on a smaller scale was continued with gogu (*Hibiscus cannabinus*), Mirabilis jalapa, Clitorea ternatea and others, for the study of Mendel's laws.

At the request of the Director of Agriculture observations were made on the cumbus (*Pennisetum typhoideum*) growing on the farm. The forms of the flowers and the rates of protrusion of the stigmas were studied and a certain number of crossings were effected. A set of 12 plants received from the Principal were subjected to a detailed analysis and the seeds kept for further sowing.

The red grams (*Cajanus indicus*) and horse grams (*Dolichos biflorus*) on the farm were similarly studied and the seed kept separate for sowing. It is hoped to gradually extend this work to all the crops of the farm.

A large number of castors were collected from various sources with the idea of future work in eri silk cultivation. Thirty-two plots of these, mostly received from Pusa, were sown, but the types were so impure that about a dozen of the best were selected, self fertilised and saved in order to get pure seed for next season. A couple of kinds of mulberry were meanwhile successfully introduced into the Botanic garden.

Some progress was made in the study of the germinative power of seeds and a standard collection of seeds of all kinds has been commenced.

Considerable activity was shown in the collection for the College, of typical economic products of the Presidency. A fieldman was on tour for 127 days in Coimbatore, South Canara and Malabar and some 180 numbers were collected, with detailed notes as to their uses and modes of cultivation.

Collections of economic products were made for the Ceylon Agricultural Society and the Lahore Exhibition and over 100 sets of specimens were forwarded.

7. *Botanic Garden.*—The Botanic garden was maintained and greatly improved in appearance during the year. It was extensively used both for carrying out the economic research work and the teaching in the College. A plan was made and the area divided up into blocks, and a permanent record of the operations in each recorded. Many trees were planted and new paths laid out. A rockery was added with a water pond for the growth of arid and water plants respectively. A small house was built for convenience in studying plants on the spot and keeping the tools and seeds under supervision. Owing to the failure of the monsoon rains little water was obtainable from the wells and these were cleared of silt, but the work generally suffered greatly from the lack of water, and other arrangements are under consideration to meet this need. The college compound was levelled and cleared and a number of trees planted. The Lawley avenue was kept under constant supervision and the trees pruned and kept in order.

8. *Mycology.*—The Mycological Assistant, M.R.Ry. S. Sundararaman, continued his period of training at Pusa and any enquiries received on fungoid pests were sent to him to be dealt with there. He returned to Coimbatore at the end of the year and joined the staff of Mr. McRae, the newly appointed Mycologist.

9. *Entomology.*—Work in the Entomological section was continued on the lines laid down by the Imperial Entomologist and reports were regularly sent to him of all work, for information and criticism. The staff consisted of two assistants trained at Pusa but there were no subordinates of any kind. A Third Assistant was added during the year.

The First Assistant, M.R.Ry. T. V. Ramakrishna Aiyar, on his return from the annual meeting at Pusa, devoted himself to placing the collections, hitherto kept in his own house, in the College rooms. He was in charge of the teaching in this subject throughout the year and kept the collections in order. A number of insect boxes were prepared locally according to the new method of lining with paraffin and a quantity of seed in the collections fumigated. A card index of the economic and systematic collections was started. The chief crop pests reported from districts and dealt with from head-quarters were the paddy stem borer, red hairy caterpillar, Deccan grasshopper, rice bug and surface grasshoppers.

Two short notes resulting from research were prepared under the editorship of the Imperial Entomologist for publication by the Bombay Natural History Society (1) Life history of a castor *Lymantriid* and (2) Breeding Notes on *Eumenes Conica.*

Three short tours were made by the First Assistant during vacations.

The Second Assistant, M.R.Ry. Y. Ramachandra Rao, upon his return from Pusa attended to the transfer of the Entomological apparatus, etc., from Madras. After that he toured at regular intervals throughout the Presidency, being 185 days absent from head-quarters. He paid visits to Bellary, Koilpatti, Bezwada, Taliparamba and made a detailed study of the pests in three districts—South Canara, Malabar and Guntúr. The most important work during the year was the study of *Leptispa pygmæa* on paddy, the hairy caterpillar at Pannicuppam in South Arcot, a serious grasshopper outbreak in the Hadagalli taluk of Bellary district (*Orthacris sp.*), and a grasshopper pest in Tinnevelly.

The Third Assistant, M.R.Ry. K. S. Padmanabha Aiyar, reached Coimbatore after his year of training in the last days of the official year.

The artist proceeded to Madras and brought all the paintings and drawings to Coimbatore. He was then largely employed in making diagrams for class teaching but added about 15 paintings to the general collection, chiefly of new varieties of sugarcane. He availed himself of three months' privilege leave.

COIMBATORE,
23rd May 1910.

C. A. BARBER,
Government Botanist.

APPENDIX IV.

REPORT OF THE MADRAS AGRICULTURAL CHEMIST FOR THE YEAR 1909–1910.

I have the honour to submit herewith my annual report for the year ending 31st March 1910.

2. *Changes in staff.*—There were no changes in either the personnel or the duties of the staff but an unsuccessful attempt was made to fill the vacant post of Research Assistant.

3. *Analytical work.*—The present year has been marked by a large increase in the analytical work, the number of samples analysed being 395 as compared with 162 in 1908–1909. A pleasing feature of the year's work is the fact that samples of soil and manures were received from cultivators residing in various parts of the Presidency and there seems to be every probability of this branch of the work extending considerably in the near future.

The samples analysed may be classified as follows:—

Alkaline soils	21
Soils	56
Sugar-canes and sugar containing plants	129
Sugar-cane products	30
Ground-nuts and oil seeds	59
Poonacs	9
Green-manures	5
Fish manure	5
Village and farm yard manures	11
Artificial manures	5
Miscellaneous manures	15
Food-grains and fodders	12
Waters	14
Silts and silty waters	24
Total	395

4. *Investigations*—(*a*) *Soils.*—An important fact brought out by the year's work is the extreme poverty in lime of the soils derived from laterite. In several instances samples of soil were received which in every respect appeared to have been well manured and cared for, and yet were only capable of yielding poor crops. In these cases lime was found to be practically absent from the soil and this was the only feature brought out by the analyses which was capable of explaining the poor cropping. The importance of dressing such soils with lime or using manures rich in that element is apparent and experiments will be carried out in this direction when a pot-culture house is available.

(*b*) *Sugar containing plants.*—Several samples of aloes were received and the juice expressed from them was analysed. They were found to contain some sucrose but the proportion of glucose and other impurities was so high that there appears to be no hope of utilizing the juice for the production of sugar.

In the case of sweet sorghums the juice was found to be comparatively rich in sucrose and the purity of the juice was fairly high. In conjunction with the Principal, experiments are now being carried out to test their value from the point of jaggery making when grown as a dry crop.

(*c*) *Hadi's process for sugar-making.*—Some preliminary experiments were carried out with Hadi's apparatus. The apparatus appears to be incapable of concentrating the juice to the jaggery stage and in the manufacture of sugar the amount of inversion was considerable. The experiments will be continued this season at the Central Farm.

(*d*) *Manurial experiments.*—In conjunction with the Deputy Director of Agriculture, Northern Division, a series of experimental plots were laid down at the Hagari Farm with the object of ascertaining the effect of dressing the soil with lime or magnesium sulphate. The results of the first year's working appear to show that whereas farm yard manure and lime used separately do not materially affect the yields, yet when used in combination a marked improvement in the yield of fodder is produced accompanied by a decrease in the amount of grain. Magnesium sulphate in small doses depressed the yield of both grain and fodder but with somewhat heavier doses the yield was normal. On the other hand, when used in conjunction with farm-yard manure, the yield of grain was greatly increased but at the same time, less fodder was obtained. The crop grown was cholam in all cases.

Permanent experiments were laid down at Samalkota in order to obtain some data on the suitability of artificial manures for the cultivation of paddy, in conjunction either with green manuring or the use of poonac. It was found that the Samalkota soil responded to the application of either super or potash.

In the Kistna delta many of the demonstration plots laid down in the previous year were continued and it has been definitely shown that the mixed manures supplied are capable of producing good crops throughout two growing seasons. In addition to these demonstration plots, a number of purely experimental plots were started, the object of these experiments being in the first place to find the manure and system of manuring, best suited to the Kistna conditions of cultivation, and, secondly, to obtain some data with regard to the manurial requirements of paddy.

(*e*) *The gases given off from paddy soils.*—The gas given off from paddy soils was collected at regular intervals and analysed. The results showed that the evolution of gas was due to an anærobic fermentation and that the gas contained a very considerable proportion of nitrogen. The latter is probably derived from the organic matters used as manures and constitutes a serious loss to cultivation. Experiments will be carried out this year to determine the effect of different methods of cultivation on the composition of gas.

5. The energies of the two assistants deputed to the Research section are fully utilized with the routine analytical work of the department and the First Assistant has been deputed to carry out in his spare time the analytical work necessary for the control of the dairy. The pot-culture house will soon be completed and the necessary work in connection with it will fall upon the present staff to the detriment of their present duties. Under these circumstances the appointment of another assistant is urgently called for.

6. *Tours.*—During the present year the Agricultural Chemist was on tour for 51 days and the members of his staff for 106 days.

COIMBATORE,
2nd May 1910.

W. H. HARRISON,
Agricultural Chemist.

II

SECTION I.—ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I

I have the honour to submit the report of the Civil Veterinary Department for the year 1909–1910.

2. The office of the Superintendent, Civil Veterinary Department, was held by Lieutenant-Colonel W. D. Gunn till the afternoon of the 7th December 1909 when I took charge. After 12 days, I was obliged to take privilege leave for 25 days, including Christmas holidays, and to go back to Lahore on private business. Mr. D. Aitchison, Principal of the Madras Veterinary College, officiated for me during the period.

3. Lieutenant-Colonel W. D. Gunn spent in camp 127 days, travelled 7,661 miles by rail and 502 miles by road. He paid two visits to each of the hospitals at Trichinopoly and Madura and one visit to those at Vellore, Tiruvannámalai, Coimbatore, Ellore, Rajahmundry, Cocanada, Pithapuram, Vizianagram, Berhampur, Bellary, Saidapet, Trichur, Pudukkóttai, Tinnevelly and Tanjore. He also inspected the quarantine station at Tuticorin and attended the Cattle show at Madura.

4. I was on tour for 56 days in camp and travelled 4,108 miles by rail and 23 miles by road. I attended the Cattle shows held at Ongole, Ellore, Pithapuram, Berhampur and Kottavalasa and had occasion to inspect the Veterinary Hospitals at Bellary, Tinnevelly, Madura, Sivaganga, Trichinopoly, Tanjore, Ongole, Ellore, Pithapuram, Cocanada and Berhampur and also the quarantine station at Tuticorin.

5 A separate report will be submitted by the Principal, Madras Veterinary College.

II.—Cattle Disease.

6. The total number of deaths among cattle during the year was 1,22,800, of which, 1,10,073 was due to disease and 12,727 to other causes. As compared with the previous year there was a decrease under each heading of disease except "Malignant sorethroat" which showed a slight increase of mortality. The decrease was very considerable under "Rinderpest" so much so that it gave a favourable turn to the tide of mortality that was during the last quinquennium rising year after year. This happy circumstance is evidently attributable to the preventive measure of inoculation carried on by Veterinary Assistants in all parts of the Presidency and to the treatment of the sick animals in the course of their tour. It is, however, very difficult to give any reliable statistics, and it may be due to the fact that all deaths have not been reported during the year.

7. The loss from rinderpest was 56,900 against 1,49,666, *i.e.*, 62 per cent. less than in the previous year. The districts that suffered most were Malabar (6,859), North Arcot (5,129), Coimbatore (4,637), Madura (4,363), Chingleput (3,992), South Arcot (3,883), Trichinopoly (3,638) and Tinnevelly (3,147). In order to check the spread of this outbreak, a Veterinary Assistant was posted to each of these districts. Deaths from unspecified diseases were 26,587 against 38,100 in the previous year. The falling off in the number is probably due to the more careful recording of mortality under appropriate headings. Wild animals accounted for 11,124 and criminal poisoning for 50 deaths.

8. Preventive inoculation against rinderpest was carried on in almost all the districts in the presidency and 46,952 head of cattle were inoculated against rinderpest, 36 against anthrax in the Nellore district and 797 against charbon symptomatique in Tanjore, Vizagapatam and Nellore districts.

9. Inoculation against anthrax has been abandoned and that against hæmorrhagic septicæmia suspended under the orders of the Inspector-General, Civil Veterinary Department.

10. The total mortality among horses and ponies was 356, of which 186 was due to disease, 31 to snake-bite and 139 to wild animals.

III.—Veterinary Hospitals.

11. At the commencement of the year there were 17 Veterinary hospitals at work, including the Veterinary hospital attached to the Madras Veterinary College for which a separate report will be submitted by the Principal. During the year five Veterinary hospitals were started, one in each of the following towns :—

(1) Ongole,
(2) Tinnevelly Bridge,
(3) Berhampur,
(4) Sivaganga, and
(5) Sivagiri.

Of these 22 Veterinary hospitals, eight, located at Madras, Saidapêt, Tiruvannámalai, Sivaganga, Tinnevelly Bridge, Ellore, Rajahmundry and Ongole, were maintained by Government. The dispensary at Ongole has since been transferred to the Local Board, while that at Tiruvannámalai was handed over to Government by the Local Board from 1st January 1910. The dispensaries at Berhampur, Vizagapatam, Cocanada, Coimbatore, Vellore, Trichinopoly, Tanjore and Madura are supported by, and are under the direct control of, the Local Boards concerned; four, at Vizianagaram, Pithápuram, Trichur and Pudukkóttai, are carried on by their respective Rajas, one at Sivagiri by its Zamindar and one at Bellary is conducted under the auspices of the Society for the Prevention of Cruelty to Animals and receives an annual donation in aid of its funds.

12. Proposals for starting Veterinary hospitals at Conjeevaram, Nellore, Kurnool, Erode, Amalapuram and Bobbili are under consideration.

13. The new hospital at Sivaganga receives contributions from the Court of Wards, Local Board and the European lessees, while it is under the direct control and management of this department.

14. The total number of in and out patients treated at these institutions is shown in statement No. V and the receipts and expenditure in statement No. VI. The total number of in-patients treated in all these institutions except Madras, Pudukkóttai, Trichur, Berhampur and Sivagiri is 24,803 which yields an average of 1,459 patients for each institution or about four patients per diem. This compares favourably with the figures of last year and the increase in the number of attendances is particularly noticeable in the Veterinary hospitals at Trichinopoly, Coimbatore, Vellore, Vizianagaram, Pithápuram, Rajahmundry and Cocanada.

IV.—Pony-breeding Operations.

15. At the commencement of the year there were 12 stallions on the rolls. They were located in the districts of Coimbatore, Salem and Madura, the places selected as suitable for the pony-breeding operations. In Coimbatore 8 stallions were stationed for the most part of the year.

'Jumna' located at Kangayam covered 27 mares against 23 in the previous year.

'Rahiman' was stationed at Pollachi throughout the year and he served 27 mares against 25.

'Punch' remained for four months at Kangayam and eight months at Dhárápuram and covered 18 mares against 28.

'Ali' was located for eight months at Kangayam in the Coimbatore district and four months at Shoolagiri in the Salem district. He served 14 mares in the former and 6 in the latter district.

'Ahmed' whose services were required both at Dhárápuram and Karúr in the Coimbatore district was credited with the highest number of coverings (viz.), 49 against 34 in the previous year.

'Mustapha' located first at Tiruppúr and then at Kollegal served 30 mares against 22.

'Turk' stationed at Satyamangalam throughout the year covered 8 mares against 10.

'Sheik' was located in Madura till May and was then transferred to Kollegal in the Coimbatore district, where he remained till December and covered 11 mares. He was next required at Trichinopoly but was found too high for the local mares. He nevertheless covered 9 mares there.

'Carbon' was stationed partly at Erode in the Coimbatore district and partly at Harur and Shoolagiri in the Salem district. He was able to cover only 4 mares in all, being too old for better service.

'Samawy' who was stationed for 11 months in Védasandúr in the Madura district and one month at Hosúr in the Salem district, covered 32 mares in the former and 1 in the latter station.

'Sunshine' whose services were in requisition both in the Madura and Salem districts, served in these districts 12 and 17 mares respectively, making a total of 29 as in the previous year.

'Selim' remained in the Salem district throughout the year and covered 12 mares. The total number of coverings made during the year was 184 in the Coimbatore, 40 in the Salem and 44 in the Madura district against 153, 47 and 39 respectively in the previous year. In addition to these there were 9 coverings made in the Trichinopoly district. On the whole, there were 277 coverings against 239 in the previous year and the average number of coverings per stallion was approximately 23 against 17·5 last year.

16. *Results of coverings.*—On the whole there were 239 coverings during the previous year in the districts of Coimbatore, Salem and Madura. Of these, results have been reported in 230 cases. From the reports received, it would appear 188 foaled, 12 aborted, 5 are in foal, 6 proved barren, 5 are doubtful and in 14 cases whereabouts are not known.

17. *Castrations.*—These operations were carried on by salustries in the Coimbatore and Salem districts. Four ponies and one bull were castrated at Pollachi, 5 ponies and 97 bulls in Dhárápuram, 2 ponies in Kollegal, 2 ponies and 78 bulls in Hosúr. The total number of operations performed during the year was 189 against 296 in the previous year. The falling off in the number of castrations is due to two salustries having been on leave, one for three months and the other for two months.

18. *Cattle-breeding.*—Of the 20 bulls purchased for breeding purposes, 2 died and 1 was disposed of by auction. The remaining 17 bulls were distributed among six districts—Ganjám, Vizagapatam, Guntúr, Madras, Madura and Tinnevelly. With the exception of the three bulls attached to the Veterinary hospitals at Berhampur, Vizagapatam and Madura and two bulls attached to the Madras Veterinary College, all these bulls are let loose to graze with the herd of cows and it is not therefore feasible to maintain any reliable register of coverings made by them. As far as could be ascertained, the average number of coverings made by each bull ranged from 2 to 10 per mensem. As it is not possible to expect regular reports on the results of coverings from the owners of the cows covered, arrangements are being made to gather the information through the Veterinary Assistants and Inspectors touring in the districts by means of local enquiries.

V.—Cattle Fairs and Shows.

19. A large number of cattle fairs were held during the year in several districts. But it was possible to depute a Veterinary Assistant to enforce the provision of the Cattle Diseases Act, II of 1866, only to twelve of these Fairs, *viz.*, those held at Kanniseri, Azhvártirunagiri, Muthulapuram, Sankaranayinárkóyil, Thimmarajapuram, Kalugumalai, Sivalaperi and Tiruchendúr in the Tinnevelly district,

Tiruvannámalai and Melmalayanur in the South Arcot district, and Subramaniapuram and Kulgunda in South Canara district. From the reports received from the Veterinary Assistants who attended these fairs, it would seem that 1,47,410 animals were assembled and exhibited for sale.

In a few fairs, rinderpest and epizootic aphtha broke out, but their progress was checked by means of suitable arrangements made by the Veterinary Assistant on the spot and there were few or no casualties. Occasion was taken to demonstrate to the people assembled the method of inoculation and the advantages arising therefrom.

20. During the year eight cattle shows were held, two at Ongole and one at each of the following places :—

Madura.	Ellore.	Berhampur.
Samayavaram.	Pithápuram.	Kottavalsa.

21. Of the two shows at Ongole, one was held in April 1909 and the other in February 1910; in the former there were only 608 entries, but in the latter 1,142—a number which was considered a record. Some very good cattle were to be seen at this show.

22. *Madura Cattle Show* was held in May 1909 in connection with the famous Chitrai festival which attracts a great crowd from neighbouring districts. The number of animals gathered for sale is estimated at 18,000 of which only 338 were selected for exhibition. A large number of sales is said to have taken place at this fair.

23. *The Samayavaram Cattle Show* was held in December 1909 in connection with the great Vikunta Ekathasi festival at Srírangam, and it was organised by the District Board and attended by a Veterinary Assistant. From his report it would appear that the best animals exhibited were of the Alambadi breed and the number assembled at the fair was approximately 3,000.

24. *The Ellore Cattle Show* was held in February 1910. The best exhibits were all of the Nellore breed, the local breeds being beneath notice. If this show does not improve very much, Government's support should be withdrawn.

25. *The Pithápuram Cattle Show* took place in March 1910. There were 460 entries against 342 in the previous year. Some very fair cattle were exhibited at this show. Pony-breeding should have a future in this district if properly controlled.

26. *The Berhampur Cattle Show* was held in March 1910. The total number of exhibits was 802 against 920 in the previous year. None of the bulls or cows exhibited was considered worthy of Government silver medals which were accordingly withheld.

27. *The Cattle Show at Kottavalasa* in the Vizagapatam district was held in March 1910. There was a large falling-off in the numbers and quality of cattle as compared with the previous year. The only animals worthy of note were draught bullocks which were well represented and contained very fine specimens.

Dates of shows should be fixtures and should not be altered.

VI.—Veterinary Inspectors and Assistants.

28. During the year 21 Veterinary Assistants were mainly employed in attending to outbreaks of cattle disease, in informing the ryots of the benefits of preventive inoculation and in carrying on, by means of persuasion, the work of inoculation in the villages affected with infectious diseases. There were 593 outbreaks and the districts that were mostly affected by them were Malabar, North Arcot, Coimbatore, the Nilgiris, Chingleput, South Arcot, Trichinopoly and Tinnevelly in each of which a Veterinary Assistant was employed to combat the epidemics by means of preventive inoculation and medical treatment. The difficulties that confronted the Veterinary Assistants on inoculation duty gradually disappeared and the ryots have begun to realise the utility of inoculation and in some districts, particularly Tanjore, they

render considerable assistance and active co-operation. The subjoined table shows the number of cattle inoculated for each disease during the last three years and statement No. III shows the number inoculated in each of the districts:—

Year.	Rinderpest.	Anthrax.	Charbon symptomatique.	Total.
1907-1908	28,914	8,461	..	37,375
1908-1909	50,487	2,353	..	52,840
1909-1910	48,101	36	797	48,934

The decrease in the total number of inoculations is partly due to the discontinuance of inoculation against Anthrax and the suspension of the use of Black legoids and Hæmorrhagic septicæmia vaccine and partly to the want of regular supply of serum from the laboratory at Muktesar.

With a view to facilitate the inspection and scrutiny of the work turned out by Veterinary Assistants, the Presidency has been divided into three circles—Northern, Central and Southern—to each of which a Veterinary Inspector is posted. These circles comprise the districts shown below:—

	Head quarters.
Northern Circle—	
Ganjám	Vizagapatam.
Vizagapatam	
Gódávari	
Kistna	
Guntúr	
Nellore	
Kurnool	
Central Circle—	
Chingleput	Madras.
South Arcot	
North Arcot	
Anantapur	
Cuddapah	
Bellary	
Madras	
Salem	
Southern Circle—	
Coimbatore	Erode.
Nilgiris	
Malabar	
South Canara	
Trichinopoly	
Madura	
Tanjore	
Tinnevelly	

29. The duties of Veterinary Inspectors generally consist in (1) checking the diaries of Veterinary Assistants in their circles, (2) in co-operating with them in combating the outbreak of contagious diseases, (3) in assisting them in inoculating cattle by means of persuasion, in case the owners are reluctant to have their animals inoculated and (4) in instructing and guiding the Veterinary Assistants in case of doubts or difficulties in carrying out their work.

Veterinary Inspector V. P. Subrahmania Mudaliyar inspected the work of the Veterinary Assistants employed on inoculation work in the Chingleput district. He was on duty till 28th May 1909 when he availed himself of combined privilege leave and furlough for two years.

Veterinary Inspector M. Hassen Ali Sahib was posted to the Southern Circle till 1st December 1909 when he was transferred to the Central Circle. He inspected the work of Veterinary Assistants in the Coimbatore, North Arcot, Tinnevelly, Chingleput and Cuddapah districts and attended the cattle shows held at Madura, Ongole and Ellore.

M.R.Ry. K. Kylasam Aiyar was appointed as Veterinary Inspector on 17th August 1909 and posted to the Central Circle till 1st December 1909 when he was transferred to the Southern Circle. On the tour of inspection he visited Chingleput, Salem, South Arcot, Bellary, Kurnool, Malabar, Coimbatore and Trichinopoly districts.

M.R.Ry. S. A. Padmanabha Pillai was in charge of the Coimbatore Veterinary hospital till 23rd June 1909 when he was appointed to act as Veterinary Inspector in the place of M.R.Ry. V. P. Subrahmania Mudaliyar who went on combined leave for two years. Posted to the Northern Circle, he carried on his inspection work in the districts of Vizagapatam, Bellary, Kurnool, Gódávari and Kistna. He also attended the cattle shows at Kottavalsa and Kalyandrug and inspected the breeding bulls and treated elephants stationed in his circle. He castrated six animals and was on privilege leave for one month from 5th July to 4th August.

30. (1) Veterinary Assistant S. C. Jeyasing Raj was posted to Coimbatore district on inoculation work and was subsequently placed in charge of the District Board Veterinary hospital.

(2) Veterinary Assistant M. P. Kanniah Nayudu was engaged on inoculation duty in Madura and Chingleput and also treated 26 animals in the course of his tour. He also acted for a month in the Veterinary hospital at Rajahmundry during the absence of the permanent incumbent on privilege leave. In the latter part of the year he was appointed to be in charge of Veterinary hospital at Sivaganga.

(3) Veterinary Assistant A. Rajappa was attending to inoculation of cattle in Ganjám, North Arcot and Cuddapah districts and treated Government elephants at Russellkonda (Ganjám district). He was on privilege leave for one month.

(4) Veterinary Assistant A. Ramachendra Aiyar inoculated 1,784 animals in South Arcot and Coimbatore districts. He also attended the cattle fair at Mailam and treated Government stallion "Punch" and in the course of his tour he had occasion to treat 144 head of cattle.

(5) Veterinary Assistant P. Velayudha Mudaliyar posted to Salem and North Arcot districts was able to inoculate 1,671 animals against rinderpest and treated 23 animals. He took privilege leave for one month.

(6) Veterinary Assistant V. Aiyasawmi Pillai chiefly attended most of the cattle fairs held in the Tinnevelly district and enforced the provisions of the Cattle Diseases Act II of 1866. He also inoculated 1,104 and treated 96 animals and castrated one pony.

(7) Veterinary Assistant P. Virabadrudu Pantulu, who was on inoculation duty, was on leave on loss of pay for eight months.

(8) Veterinary Assistant K. Dorasawmy Nayudu, was posted to the Nellore district, inoculated 2,598 and treated 236 animals. He also attended the Cattle Shows held at Ellore, Pittapur and Berhampur.

(9) Veterinary Assistant A. L. N. Somayajulu Pantulu was employed in Vizagapatam and Ganjám districts. He inoculated 2,102 and treated 200 animals. He took leave for 20 days on loss of pay.

(10) Veterinary Assistant C. Suryanarayanamurthi Pantulu worked in the Kistna and Anantapur districts, inoculated 1,824 animals and castrated one pony. He also treated 250 animals.

(11) Veterinary Assistant K. Seshagiri Rao, who worked in Guntúr, Anantapur and Kistna districts, inoculated 1,202 and treated 250 animals. He also attended the cattle show held at Ongole and inspected and reported upon Government breeding bulls stationed in the Guntúr district.

(12) Veterinary Assistant K. S. Natesa Aiyar who was posted first to Kurnool and then to Salem district inoculated 2,505 and treated 751 head of cattle.

(13) Veterinary Assistant C. Venkataratnam Chetty employed in the Cuddapah, Bellary and Kurnool districts, inoculated 2,560 animals and treated 16.

(14) Veterinary Assistant M. Audimula Mudaliyar, who worked in Chingleput and Trichinopoly districts, inoculated 3,052 animals, castrated 11 and treated 139. He also attended the cattle show held at Samayavaram in the Trichinopoly district and was for a period of $1\frac{1}{2}$ months placed in charge of Vellore Hospital in the North Arcot district.

(15) Veterinary Assistant K. R. Krishna Aiyar was on inoculation duty in Trichinopoly and Madura districts. He inoculated 2,733 animals and treated 137.

(16) Veterinary Assistant V. M. Subbarama Aiyar worked in North Arcot, Bellary and Malabar districts. He inoculated 2,825 and treated three animals. He was on privilege leave for one month.

(17) Veterinary Assistant P. Chidambara Nadar inoculated 1,724 animals in the Coimbatore, the Nilgiris and the Anantapur districts. He also attended the cattle fair held at Kalyandrug in the Anantapur district.

(18) Veterinary Assistant T. S. Alagappa Pillai who was posted to the Tanjore district throughout the year was able to inoculate against rinderpest so many as 7,268 head of cattle, the highest number inoculated in any district during the year. He also treated in the course of his tour 41 animals.

(19) Veterinary Assistant M. Hason Hazari Sahib inoculated 2,485 animals in Salem and South Arcot districts, treated 12 animals, attended the cattle fair held at Tiruvannámalai in South Arcot district and was subsequently placed in charge of Veterinary Hospital at Tinnevelly Bridge.

(20) Veterinary Assistant S. S. Theetharappa Mudaliar worked in Tinnevelly district, inoculated 2,586 animals and also attended a few cattle fairs in the district. He was on leave for two months on loss of pay.

(21) Veterinary Assistant A. Castelino was on inoculation work in South Canara district and treated 91 animals.

(22) Veterinary Assistant M. James was employed in the Nilgiri and Malabar districts on inoculation work. He officiated for 20 days at the Vellore Veterinary Hospital during the absence of the permanent incumbent on privilege leave and was subsequently placed in charge of Veterinary Hospital at Tinnevelly Bridge. He was on privilege leave for one month.

(23) Veterinary Assistant V. Krishnamurti Aiyar inoculated 685 animals belonging to the Madras Corporation and 219 in the Nilgiri district. He also attended the cattle show held at Madura and was subsequently transferred to the Veterinary Hospital attached to the Madras Veterinary College.

31. The followiug graduates were employed during the year :—

(24) Veterinary Assistant M. N. Ahmed Saheb who was employed in June 1909 worked in the Kistna and Kurnool districts and inoculated 1,282 animals.

(25) Veterinary Assistant M. Sundaranathan was on inoculation duty in Bellary and Tanjore districts.

(26) Veterinary Assistant C. R. Veeraswami Sarma inoculated a few animals in Madras and Bellary.

(27) Veterinary Assistant L. Subrahmania Aiyar was engaged in the North Arcot district on inoculation duty.

(28) Veterinary Assistant P. V. Ramaswami Aiyar did inoculation work in the Trichinopoly district.

(29) Veterinary Assistant T. R. Rajagopal Rao inoculated a few animals of the Madras Corporation and was then posted to the Madura district.

(30) Veterinary Assistant V. Kunchi Raman Nair who entered service in February 1910 was employed in the Malabar and the Nilgiri districts on inoculation work. He castrated one animal.

(31) Veterinary Assistants W. A. Douglas, V. R. Sangameswara Sastri, S. Kesavulu Nayudu and M. Thandeswara Aiyar resigned their appointments during the year.

32. There can be little doubt that Veterinary Assistants in districts find it very difficult to exist on the very small pay they receive and if Government could see their way to put the subordinate department on the same basis as that of Bombay and Sindh, I am confident it would help to increase the proficiency and zeal of the staff. This matter has been represented before by former Superintendents. It would perhaps be too much at present to ask Government to promote men to the Deputy Superintendent grade, but more inspectorships might be granted and one Deputy Superintendent would encourage men to work for a future advancement.

Fifty-one thousand doses of anti-rinderpest serum and 5,000 charbon symptomatique pilules were received during the year from the Imperial Bacteriologist.

W. O. DAWSON, Captain, A.V.C.,
Superintendent, Indian Civil Veterinary Department.

TABLE I.—Abstract showing main results of Veterinary Colleges and Schools during the year 1909–1910.

Veterinary College and Schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the year 1909.		Passed final examination during the year.	Failed to pass final examination.	Remaining under instruction at the end of the year 1909.				
		Scholarship holders.	Others.			In ordinary course.	Instruction prolonged by reason of failure.	Matriculated with higher qualifications.	Knowing English but not matriculated.	Knowing very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary College, Madras.	..	10	20	12	9	58	9	3	27	..

Veterinary College and Schools.	Receipts.			Expenditure.			Employment of students passed out during three years preceding.				
	From fees.	From other sources.	Total.	Salaries of instruction staff.	Other expenses.	Total.	Total number passed.	In service of local bodies or Government.	In the service of other bodies.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
Veterinary College, Madras.	RS. A. P. 14,243 2 10	..	RS. A. P. 14,243 2 10	RS. A. P. 15,945 3 1	RS. A. P. 3,224 0 0 (scholarship).	RS. A. P. 19,169 3 1	53	* 37 British service. 3 Local Board.	1 Zamindari service. 5 Native states.	7	

* Includes one under Coorg Government and four resigned during the year.

TABLE II—Showing number of deaths from contagious diseases amongst animals during the year 1909–1910.

Province.	Equines.						Bovines.			
	Glanders.	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest.	Foot and mouth disease.	Hæmorrhagic Septicæmia.	Black quarter.
1	2	3	4	5	6	7	8	9	10	11
Madras	..	14	..	..	..	..	56,900	3,260	6,954	4,404

Province.	Bovines—*cont.*			Others.						
	Anthrax.	Other contagious diseases.	Total.	Rabies.	Plague.	Hæmorrhagic Septicæmia.	Gillar.	Anthrax.	Other contagious diseases.	Total.
	12	13	14	15	16	17	18	19	20	21
Madras	11,968	26,587	110,073	..	..	..	..	..	..	..

TABLE III.—Statement showing results of preventive inoculation during the year 1909–1910.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Ganjám	Rinderpest.	By serum alone method.	12	..	33	..	..	328	191	..	..	..
2. Vizagapatam			22	..	287	136	..	1,291	57	..	..	..
3. Gódávari			9	..	117	..	..	700	125	..	..	..
4. Kistna			5	..	125	..	..	1,420	..	..	..	..
5. Guntúr			10	..	212	..	..	1,200	..	..	..	..
6. Nellore			11	..	162	..	..	1,841	..	..	7	..
7. Chingleput			35	..	712	..	..	3,257	..	..	..	..
8. Madras			2	..	..	..	..	2,119	..	..	..	..
9. South Arcot			23	..	797	..	..	1,804	317	..	..	..
10. North Arcot			33	..	784	..	..	3,229	..	..	..	..
11. Salem			30	..	323	450	..	2,254	38	..	..	..
12. Coimbatore			69	..	910	..	..	2,790	63	..	3	..
13. Trichinopoly			14	..	1,731	..	..	2,487	..	..	4	..
14. Tanjore			54	..	540	..	..	7,116	..	..	..	..
15. Madura			9	..	211	..	..	783	..	..	..	..
16. Tinnevelly			76	..	586	439	..	4,601	..	..	1	..
17. Nilgiris			45	..	928	..	..	1,161	114	..	1	..
18. Bellary			29	..	258	..	..	1,683	33	..	..	..
19. Anantapur			16	..	416	..	..	1,490	..	..	..	..
20. Cuddapah			31	..	655	..	..	1,251	28	..	..	..
21. Kurnool			12	..	148	..	..	1,699	..	..	10	..
22. Malabar			32	..	2,497	..		1,759	183	..	..	..
23. South Canara ..			14	..	292	..	..	689	..	..	12	..
Total ..	..	..	593	..	12,724	1,025	..	46,952	1,149	..	38	..

Table III.—Statement showing results of preventive inoculation during the year 1909–1910—*cont.*

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
Vizagapatam	Charbon Symptomatique.	Injection of black quarter pilules.	5	..	81	..	..	797	..	..	..	..
Nellore												
Tanjore												
		Total ..	5	..	81	..	..	797	..	..	..	..
Nellore	Anthrax.	By serum alone.	..	..	..	..	..	36	..	..	..	..
		Total ..	..	..	..	..	..	36	..	..	..	..

TABLE IV.—Statement showing the number of animals treated and castrated by Veterinary Assistants and by Salustries on tour during the year 1909–1910.

Province.		Number of villages visited.	Number of veterinary assistants or salustries employed.	Castrations performed.				Treated for contagious diseases.				Treated for non-contagious diseases.				Total number of cases treated and castrations performed.
				Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Madras	By Veterinary Assistants.	..	..	2	17	1	20	..	..	..	..	95	1,557	217	1,869	1,889
	By Salustries ...	..	..	13	176	..	189	..	..	..	..	..	..	..	..	189
	Total ..	..	..	15	193	1	209	..	..		..	95	1,557	217	1,869	2,078

TABLE V.—Statement showing the number of animals treated at Veterinary Hospitals during 1909–1910.

Province.	Number of veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients.														
			Remaining on 1st April 1909.			Admitted during the year.			Total.			Discharged during the year.			Balance on 31st March 1910.		
			Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Saidapet ..	1	1	4	..	11	54	17	113	58	17	124	54	13	118	4	4	6
Vellore ..	1	1	5	9	1	51	73	5	56	82	6	51	79	5	5	3	1
Madura ..	1	1	5	1	..	54	6	7	59	7	7	58	7	7	1	..	..
Trichinopoly ..	1	1	7	17	4	138	162	53	145	179	57	140	168	54	5	11	3
Coimbatore ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vizianagram ..	1	1	4	..	..	110	10	3	114	10	3	110	10	3	4	..	..
Vizagapatam ..	1	1	3	4	2	27	18	40	30	22	42	29	19	29	1	3	13
Pithápuram ..	1	1	..	..	..	4	4	..	4	4	..	4	4	..	..	..	..
Bellary ..	1	1	4	4	2	90	127	125	94	131	127	89	129	124	5	2	3
Rajahmundry.	1	1	..	..	..	..	8	9	..	8	9	..	8	8	..	..	1
Cocanada ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ellore ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tiruvannámalai.	1	1	..	..	..	6	22	..	6	22	..	6	22	..	..	..	..
Tanjore ..	1	1	..	2	..	46	61	18	46	63	18	45	60	18	1	3	..
Sivaganga ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tinnevelly ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sivagiri ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Berhampur ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ongole ..	1	1	..	..	..				..	..	..	..	..	..	..	..	..
Trichur ..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pudukkóttai ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	21	22	32	37	20	580	508	373	612	545	393	586	519	366	26	26	27
Madras ..	1	1	26	32	13	483	167	425	509	199	438	487	181	426	22	18	12
Grand total ..	22	23	58	69	33	1,063	675	798	1,121	744	831	1,073	700	792	48	44	39

Province.	Out-patients.														
	Number treated during the year.			Average daily attendance.			Total number of in- and out-patients treated during the year.			Total.	Receipts.			Expenditure		
	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.							
	19	20	21	22	23	24	25	26	27	28	29			30		
											Rs.	A.	P.	Rs.	A.	P.
Saidapet ..	115	498	239	5·07	14·26	11·39	173	915	363	1,051	484	3	3	1,068	14	1
Vellore ..	134	419	357	8·5	14·3	6·5	190	501	363	1,054	238	14	0	1,517	10	8
Madura ..	199	483	154	10·64	13·8	4	258	490	161	909	80	14	0	1,595	13	2
Trichinopoly ..	172	766	150	11	37	2	317	945	207	1,469	2,705	4	1	2,705	4	1
Coimbatore ..	2,638	5,544	1,851	7·23	15·19	5·07	2,638	5,544	1,851	10,033	2,817	3	11	1,817	3	11
Vizianagram ..	384	145	216	14	2	3	498	155	219	872	1,569	8	0	1,398	1	9
Vizagapatam ..	108	203	362	5·4	7·89	6·97	138	225	404	767	2,019	11	0	1,328	1	5
Pithápuram ..	191	819	847	5·797	16·243	12·693	195	823	847	1,865	..			2,434	0	0
Bellary ..	451	692	643	14·1	28·6	14·6	545	823	770	2,138	3,937	3	0	3,937	3	0
Rajahmundry.	60	311	335	2·1	10·9	8·5	60	319	344	723	..			619	9	0
Cocanada ..	192	436	588		18·9		192	436	588	1,216	182	7	0	2,401	15	10
Ellore ..	87	446	169	2	10	2	87	446	169	702	..			627	5	6
Tiruvannámalai.	95	333	85	2·44	8·67	1·19	101	355	85	541	..			790	8	1
Tanjore ..	212	481	146	·58	1·3	·4	258	544	164	966	1,853	10	7	1,969	13	5
Sivaganga ..	7	77	16	1·3	6·67	·75	7	77	16	100	15	2	0	238	6	0
Tinnevelly ..	91	141	57	5	5·5	1·8	91	141	57	289	..			..		
Sivagiri ..	..	..	..	..	..	..	..	..	..	..	..			..		
Berhampur ..	..	..	..	..	..	..	..	..	..	..	..			..		
Ongole ..	..	..	..	..	..	..	..	..	..	108	..			..		
Trichur ..	..	..	..	..	..	..	..	..	..	..	..			..		
Pudukkóttai ..	..	..	..	..	..	..	..	..	..	..	..			..		
Total ..	5,136	11,794	6,215	..	..	..	5,748	12,339	6,608	24,803	15,904	0	10	24,449	13	11
Madras ..	303	142	483	7·5	2·0	9·07	812	341	921	2,074	14,243	2	10	39,641	15	1
Grand total ..	5,439	11,936	6,698	..	..	..	6,560	12,680	7,529	26,877	30,147	3	8	64,091	13	0

TABLE VI.—Abstract showing receipts and expenditure of Veterinary Dispensaries during 1909–1910.

Province.	Receipts.						
	Last year's balance.	By local fund grants.	By Government grants.	By municipal contributions.	By fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1. Saidapet	798 15 8	..	..	..	408 13 3	75 6 0	484 3 3
2. Vellore	—1,974 4 5	..	120 0 0	110 0 0	..	8 14 0	238 14 0
3. Madura	—1,716 2 2	..	..	..	80 14 0	..	80 14 0
4. Trichinopoly	Not received.	1,930 3 1	..	..	775 1 0	..	2,705 4 1
5. Coimbatore ..	339 8 0	1,817 3 11	..	..	..	1,000 0 0	2,817 3 11
6. Vizianagram	1,188 15 8	1,569 8 0		..	..	..	1,569 8 0
7. Vizagapatam	420 1 7	1,520 0 0	..	..	499 11 0	..	2,019 11 0
8. Pithápuram	Not received	..	..	..	..	..	..
9. Bellary	Do.	1,874 12 6	360 0 0	..	221 11 6	1,480 11 0	3,937 3 0
10. Rajahmundry	Do.	..	..	..	..	..	..
11. Cocanada	1,376 0 0	..	..	..	182 7 0	..	182 7 0
12. Ellore	— 181 2 5	..	..	..	..	..	..
13. Tiruvannámalai ..	1,015 14 5	..	..	..	..	..	..
14. Tanjore	— 4 8 0	1,754 0 0	..	..	99 0 0	0 10 7	1,853 10 7
15. Sivaganga	..	..	..	..	15 2 0	..	15 2 0
16. Tinnevelly	..	..	..	..	..	..	..
17. Sivagiri	..	..	..	..	..	..	..
18. Berhampur	..	..	..	..	..	..	..
19 Ongole	..	..	..	..	..	..	..
20. Trichur	..	..	..	..	..	..	..
21. Pudukkóttai	..	..	..	..	..	..	..
Total ..	..	10,465 11 6	480 0 0	110 0 0	2,282 11 9	2,565 9 7	15,904 0 10
Madras	—25,586 7 3	..	..	..	14,243 2 10	..	14,243 2 10
Grand total ..	..	10,465 11 6	480 0 0	110 0 0	16,525 14 7	2,565 9 7	30,147 3 8

Province.	Expenditure.						Balance (excludes figures in column 2).
	Pay.	Travelling allowance.	Medicine and instruments.	Furniture.	Contingencies.	Total.	
	9	10	11	12	13	14	15
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A P.	RS. A. P.
1. Saidapet	984 3 1	..	..	..	84 11 0	1,068 14 1	— 584 10 10
2. Vellore	969 13 5	15 11 0	..	..	532 2 3	1,517 10 8	—1,278 12 8
3. Madura	1,027 12 6	..	395 13 4	..	172 3 4	1,595 13 2	—1,514 15 2
4. Trichinopoly	1,731 12 0	168 3 1	584 5 4	..	220 15 8	2,705 4 1	*Nil.*
5. Coimbatore	946 4 11	..	583 1 7	..	287 13 5	1,817 3 11	+1,000 0 0
6. Vizianagram	861 8 3	62 10 0	331 14 0	..	142 1 6	1,398 1 9	+ 171 6 3
7. Vizagapatam	994 12 2	..	191 10 1	..	141 11 2	1,328 1 5	+ 691 9 7
8. Pithápuram	1,194 0 0	360 0 0	700 0 0	..	180 0 0	2,434 0 0	—2,434 0 0
9. Bellary	1,664 7 9	..	1,140 8 2	658 9 4 shoeing.	473 9 9	3,937 3 0	*Nil.*
10. Rajahmundry	596 0 0	..	..	..	23 9 0	619 9 0	— 619 9 0
11. Cocanada	1,288 5 0	..	732 7 0	..	381 3 10	2,401 15 10	—2,219 8 10
12. Ellore	497 3 1	..	..	..	130 2 5	627 5 6	— 627 5 6
13. Tiruvannámalai .	606 1 10	..	123 9 3	..	60 13 0	790 8 1	— 790 8 1
14. Tanjore	1,205 1 5	..	523 7 1	..	241 4 11	1,969 13 5	— 116 2 10
15. Sivaganga	182 0 0	30 4 0	..	..	26 2 0	238 6 0	— 223 4 0
16. Tinnevelly	..	..	..	..	..	..	..
17. Sivagiri	..	..	..	..	..	..	..
18. Berhampur	..	..	..	..	..	..	..
19. Ongole	..	..	..	..	..	..	..
20. Trichur	..	..	..	..	..	..	..
21. Pudukkóttai	..	..	..	..	..	..	..
Total ..	14,749 5 5	636 12 1	5,306 11 10	658 9 4	3,098 7 3	24,449 13 11	..
Madras	21,849 7 8	188 15 0	5,743 11 0	161 10 10	11,698 2 7	39,641 15 1	—24,815 8 3
Grand total ..	36,598 13 1	825 11 1	11,050 6 10	820 4 2	14,796 9 10	64,091 13 0	..

TABLE VII.—Statement showing strength of subordinate Veterinary staff employed during the year 1909-1910.

Province.	How occupied.	Whether paid from Provincial or from Local funds.	Veterinary Inspector.	Veterinary Assistant.	Subordinate teaching staff.	Remarks.
1	2	3	4	5	6	7
Madras ..	Itinerating and attending cattle fairs and shows.	Provincial ..	3 *	25 †	..	* One of them was on furlough and one Veterinary Assistant acted for him. † Of these four were under training.
		Local Fund and Provincial.	..	15 ‡	..	‡ Including four having no lien on Government service and excluding one attached to Madras Veterinary College.
	In charge of hospitals.	Rajas and Zamindars.	..	5 §	..	§ Includes two in Cochin and one in Pudukotah States having no lien on British service.
		Society for the Prevention of Cruelty to Animals.	..	1 ‖	..	‖ Having no lien on Government service
	In charge of quarantine depot.	....	..	1	..	..
	College work ..	Provincial ..	..	1 ¶	4 **	¶ Hospital Surgeon ** One Assistant Principal and three Lecturers.
		Total ..	3	48	4	

Note.—Eight Veterinary Assistants at Cocanada, Trichinopoly, Tanjore, Madura, Cochin, Pudukotah and Bellary have no lien on Government service.

TABLE VIII.—Return of stud bulls for the year 1909-1910.

Province.	Property of Government.					Property of local bodies.				
	Number on 1st April 1909.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1910.	Number on 1st April 1909.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1910.
		No.	Average price paid.				No.	Average price paid.		
1	2	3	4	5	6	7	8	9	10	11
Madras	18	..	..	1 *	17	..	..	..	..	..

* Sold by auction.

N.B.—The bulls are posted thus—one in Ganjám district, three in Vizagapatam district, eight in Guntúr, two in Tinnevelly, two in Madras and one in Madura.

TABLE IX.—Statement showing main results of the working of Provincial cattle farm during the year 1909-1910—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions, under Government and local bodies, for the year 1909-1910.

Details.	Horse and pony stallions under local bodies.												
	Horses.						Ponies.						
	Arab.	Persian.	Thorough-bred English.	Country-bred.	Australian.	Total.	Arab.	Persian.	Country-bred.	Delhi.	Shan.	Total.	Total horses and ponies.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Balance on 31st March 1909	..	..	..	..	..	..	12	..	..	..	..	12	12
Increase. By transfer.	..	..	..	..	..	..	..	..	..	..	..	..	..
Increase. Purchased in India ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Increase. Received from Europe by purchase ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	12	..	..	..	..	12	12
Decrease. Died ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Decrease. Sold	..	..	..	..	..	..	..	..	..	..	..	..	..
Decrease. Destroyed ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Decrease. Transferred to	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	12	..	..	..	..	12	12 *

Details.	Donkey stallions under local bodies.								
	Italian.	Cyprian.	Country-bred (Punjabi).	Persian.	Catalonian.	Arab.	American.	Sicilian.	Total.
	15.	16	17	18	19	20	21	22	23
Balance on 31st March 1909	..	..	..	..	..	..	..	..	..
Increase. By transfer.	..	..	..	..	..	..	..	..	..
Increase. Purchased in India ..	..	..	..	..	..	..	..	..	..
Increase. Received from Europe by purchase.	..		..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	..	..	..
Decrease. Died ..	..	..	..	..	..	..	..	..	..
Decrease. Sold ..	..	..	..	..	..	..	..	..	..
Decrease. Destroyed ..	..	..	..	..	..	..	..	..	..
Decrease. Transferred to ..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	..	..	..

* Under Government.

TABLE XI.—Services and produce of each class of horse, pony and donkey stallions under local bodies during the year 1909–1910.

Horse, pony or donkey.	Province.	Stallions on register on 31st March 1910.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
..	Madras ..	12 stallions.	12	13	277	239	23	17·5	

TABLE XII.—Average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1909–1910.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	Rs. A. P. 690 12 11	Rs. A. P. 397 9 7	..	..	The total expenditure for upkeep alone of 12 Government stallions for the whole year amounted to Rs. 8,289–11–6.

TABLE XIII.—Abstract of particulars regarding horse fairs and shows held in non-selected districts during the year 1909–1910—*Nil.*

TABLE XIV.—Abstract of particulars regarding cattle fairs and shows held during the year 1909–1910.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animals sold.				
		Bulls.	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cattle Fairs.										Rs.	Rs.		
Kanniseri	1	..	18,000	300	2,000	200	..	15	..	75	25	..	..
Azhwartirunagari ..	1	..	6,000	..	..	..	..	..	..	..	..	..	..
Muthalapuram	1	..	12,000	175	1,000	300	..	25	..	..	..	..	..
Sankaranayinarkoyil ..	1	..	8,000	..	..	..	..	..	..	..	..	..	..
Thimmarajapuram ..	1	..	4,000	..	..	..	..	..	..	..	..	..	..
Kalugumalai	2	..	40,000	75	1,900	800	..	..	..	85	47	..	..
Tiruchandur	1	..	6,000	..	..	..	..	..	..	75	38	..	..
Sivaliparai	1	..	11,700	30	..	270	..	..	..	115	45	..	..
Thiruvannamalai	1	..	13,000	..	..	..	..	50	..	..	..	..	..
Melamalayanur	1	..	7,000	..	..	..	..	..	..	..	..	..	..
Subbramaniyapuram ..	1	..	700	..	..	..	..	..	..	..	..	..	..
Kulgunda	1	..	2,302	..	..	4,351	..	..	..	..	..	..	..
Cattle Shows.													
Ongole	2	411	102	419	534	92	..	192	..	..	..	..	..
Madura	1	20	300	7	3	1	..	7	..	..	..	..	..
Samayavaram	1	..	..	..	..	..	..	..	..	..	..	..	..
Ellore	1	129	182	103	15	85	..	..	..	..	..	..	..
Pithapur	1	58	121	62	56	79	..	84	..	..	..	..	..
Berhampur	1	14	556	33	26	64	..	109	..	..	..	..	..
Kottavalasa	1	34	206	24	20	55	..	14	..	..	..	..	..
Total ..	21	666	130,169	1,228	5,554	6,297	..	496	..	..	..	..	..

—	Amount realised in fees.	Total number of animals that competed for prizes.	Prizes awarded.						Number of medals.
			From Imperial funds.	From Provincial funds.	From local funds.	From other sources.	Total.	Amount actually awarded.	
	15	16	17	18	19	20	21	22	23
Cattle Fairs.	Rs. A. P.		Rs.	Rs.	Rs.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Kanniseri	..	20,515	..	..	..	..	..	..	..
Azhwartirunagari ..	..	6,000	..	..	..	..	..	..	..
Muthalapuram	..	13,500	..	..	..	..	..	..	..
Sankaranayinarkoyil ..	..	8,000	..	..	..	..	..	..	..
Thimmarajapuram ..	..	4,000	..	..	..	..	..	..	..
Kalugumalai		42,775	..	..	..	..	..	..	..
Tiruchandur	..	6,000	..	..	..	..	..	..	..
Sivaliparai	..	12,000	..	..	..	..	..	..	..
Tiruvannamalai	..	13,050	..	..	..	..	..	..	..
Melamalayanur	..	7,000	..	..	..	..	..	..	..
Subbramaniyapuram ..	..	700	..	..	..	..	..	..	..
Kulgunda	.	6,653	..	..	..	..	..	..	..
Cattle Shows.									
Ongole	..	1750	..	3,000	2,335	1,653 0 0	6,988 0 0	4,867 0 0	6
Madura	..	338	..	..	525	70 0 0	595 0 0	290 4 0	1
Samayavaram	..	3,000	..	..	..	..	..	..	2
Ellore	9 13 0	514	..	250	350	1,152 13 9	1,762 10 9	330 0 0	2
Pithapur	..	460	..	500	..	800 0 0	1,300 0 0	1,233 0 0	4
Berhampur	828 15 8	802	..	500	600	930 14 10	2,030 14 10	659 0 0	8
Kottavalasa	..	353	..	500	400	700 0 0	1,600 0 0	1,018 0 0	6
Total ..	838 12 8	147,410	..	4,750	4,210	5,306 12 7	14,276 9 7	8,397 4 0	29

TABLE XIV (*a*).—Statement showing the cost of the Civil Veterinary Department in the Province of Madras during the financial year 1909–1910.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
1	2	3	4	5
Civil Veterinary Department.				
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Superintendence	19,068 1 10	11,306 2 8	..	30,374 4 6
Subordinate establishment	..	25,702 11 9	..	25,702 11 9
Hospitals and dispensaries	..	2,932 13 4	14,953 4 5	17,886 1 9
Breeding operations	..	8,289 11 6	..	8,289 11 6
Prizes	..	..	..	..
Fairs and shows	..	3,145 0 0	1,665 0 0	4,810 0 0
Total ..	19,068 1 10	51,376 7 3	16,618 4 5	87,062 13 6
Madras Veterinary College.				
Veterinary instruction	7,828 8 0	31,813 7 1	*Nil.*	39,641 15 1

TABLE XV.—Comparative statement of cattle mortality for five years ending 1909–1910.

Causes of death.	Number of deaths among cattle for the year ending				
	1905–1906.	1906–1907.	1907–1908.	1908–1909.	1909–1910.
1	2	3	4	5	6
Diseases.					
Rinderpest	19,050	31,611	97,244	149,666	56,900
Anthrax	12,474	12,082	10,977	12,511	11,968
Malignant sore-throat	8,838	9,086	7,190	6,888	6,954
Black quarter	5,952	4,168	6,148	4,708	4,404
Epizootic aphtha	4,074	2,794	3,544	4,578	3,260
Others	38,905	53,798	27,731	38,100	26,587
Total ..	90,293	113,539	152,834	216,451	110,073
Other causes.					
Snake bite	2,011	1,899	1,885	1,625	1,553
Wild animals	13,232	13,372	12,611	11,412	11,124
Criminal poisoning	58	43	56	26	50
Total ..	15,301	15,314	14,552	13,063	12,727
Grand total ..	105,594	128,853	167,386	229,514	122,800

TABLE XVI.—Statistics of mortality among cattle, horses and ponies in the several districts of the Madras Presidency during the year 1909–1910.

Districts.	Number of deaths among — Cattle — From diseases. — Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám	2,812	..	645	495	237	421	754	5,364	55	193	..
2. Vizagapatam	808	..	731	435	770	239	401	3,394	47	142	..
3. Gódávari	1,152	..	1,387	538	195	196	1,349	4,817	106	264	19
4. Kistna	2,059	..	1,544	801	201	307	2,336	7,145	199	74	2
5. Guntúr	814	..	163	526	269	72	521	2,365	47	22	1
6. Kurnool	613	..	1,026	245	459	83	3,542	5,968	91	393	..
7. Bellary	540	..	205	156	386	56	2,287	3,630	19	151	..
8. Anantapur	1,407	..	342	198	465	119	2,494	5,025	26	287	..
9. Cuddapah	1,480	..	638	199	176	60	1,076	3,629	32	360	..
10. Nellore	700	..	854	765	579	103	1,847	4,848	105	109	..
11. Chingleput	3,992	.	858	437	71	49	449	5,856	97	2	3
12. South Arcot	3,883	..	421	90	69	81	1,392	5,936	91	132	6
13. North Arcot	5,129	..	517	205	70	43	553	6,517	153	503	..
14. Salem	2,675	..	84	34	59	197	829	3,878	52	273	..
15. Coimbatore	4,637	..	104	197	179	513	1,339	6,969	34	556	..
16. Trichinopoly	3,638	..	311	94	10	381	1,754	6,188	51	97	3
17. Tanjore	2,845	..	504	399	27	50	448	4,273	98	1	2
18. Madura	4,363	..	602	251	49	180	893	6,338	92	187	4
19. Tinnevelly	3,147	..	256	72	50	17	878	4,420	58	27	6
20. Nilgiris	2,411	..	3	19	5	16	169	2,623	3	249	4
21. Malabar	6,859	..	584	608	63	71	1,091	9,276	84	1,955	..
22. South Canara	936	..	192	190	15	6	275	1,614	13	5,147	..
Total ..	56,900	..	11,968	6,954	4,404	3,260	26,587	110,073	1,553	11,124	50

Districts.	Number of deaths among—*cont.* — Cattle—*cont.* — Total.	Grand total.	Total stock by the latest census.	Horses and ponies. — From diseases. — Diarrhœa and dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.
13	14	15	16	17	18	19	20	21	22	23	24
1. Ganjám	248	5,612	332,942	2	..	..	2	..	..	..	..	2
2. Vizagapatam	189	3,583	128,721	..	..	1	1	..	..	..	..	1
3. Gódávari	389	5,206	534,543	4	5	12	21	1	1	..	2	23
4. Kistna	275	7,420	1,214,756	..	2	5	7	2	10	..	12	19
5. Guntúr	70	2,435	1,536,558	..	..	6	6	24	36	..	60	66
6. Kurnool	484	6,452	186,369	..	2	15	17	..	5	..	5	22
7. Bellary	170	3,800	502,360	..	1	22	23	..	4	..	4	27
8. Anantapur	313	5,338	1,548,723	2	..	15	17	1	6	..	7	24
9. Cuddapah	392	4,021	942,078	1	..	4	5	..	1	..	1	6
10. Nellore	214	5,062	972,975	1	..	5	6	..	1	..	1	7
11. Chingleput	102	5,958	662,698	..	1	3	4	..	..	..	..	4
12. South Arcot	229	6,165	1,182,069	..	..	1	1	..	1	..	1	2
13. North Arcot	656	7,173	896,082	1	..	3	4	1	3	..	4	8
14. Salem	325	4,203	1,090,690	4	..	..	4	..	1	..	1	5
15. Coimbatore	590	7,559	1,151,637	10	..	8	18	..	8	..	8	26
16. Trichinopoly	151	6,339	609,139	..	..	9	9	..	54	..	..	9
17. Tanjore	101	4,374	936,740	1	..	10	11	..	..	..	..	11
18. Madura	283	6,621	1,143,644	2	1	16	19	2	..	..	56	75
19. Tinnevelly	91	4,511	1,590,898	..	2	5	7	..	..	..	..	7
20. Nilgiris	256	2,879	62,530	..	..	2	2	..	7	..	7	9
21. Malabar	2,039	11,315	966,058	..	..	..	..	..	..	..	..	..
22. South Canara	5,160	6,774	689,862	..	..	2	2	.	1	..	1	3
Total ..	12,727	122,800	18,882,072	28	14	144	186	31	139	..	170	356

SECTION II.—ANNUAL REPORT OF THE PRINCIPAL, MADRAS VETERINARY COLLEGE.

I have the honour to submit the Annual Report of the Madras Veterinary College for the year 1909–10.

2. The office of Principal was held by me throughout the year. The only change in the staff of the Madras Veterinary College during the year was the appointment of Mr. S. Sankaramurthia Pillai, G.M.V.C., from the Vizianagaram dispensary, as third lecturer, in place of Mr. Kylasam Aiyar, G.B.V.C., who was transferred to the Civil Veterinary Department of the Madras Presidency.

3. The selection of candidates for enrolment of students of the new class A was not made till 25th January 1909. The delay was due to the very few applications that were received up to the end of December 1908. After publication of the notice for applications in the local newspapers and subsequently in the *Fort St. George Gazette*, 70 candidates were selected by Colonel W. D. Gunn who was then Principal, out of which only 3 were Matriculates, 67 non-Matriculates and 2 students who failed in the previous year's examination. Thirty of the most promising of these students were finally selected by me and retained in class A. In class B there were 17 students and in class C 21 students. Of these, 30 in class A, 16 in class B and 21 in class C continued their studies till the end of the year and appeared before the Board of Examiners with the following results :—

Class.	Year.	Number presented.	Number passed.	Percentage.
A	1909	30	20	66·6
B	,,	16	10	62·5
C	,,	21	12	57

Comparing the percentage of passes in December 1909 to that of 1908, it will be noticed that there is a distinct decline in all three classes. I had anticipated an unfavourable result throughout the year, and I attributed the lower percentage of passes to the very large number of non-matriculated and badly educated students admitted into the college during the three previous years.

4. Twelve students graduated from the college during the year out of which number only 7 have been selected by the Superintendent for service in the Civil Veterinary Department. I selected the students for the current year's A class on the 3rd January. The class promises well and consists of 1 F.A., 14 Matriculates, 4 non-Matriculates and 4 last year's failed students, making a total of 23 which is 3 more than the sanctioned number and is to allow for vacancies which may occur in the class from year to year.

5. I am pleased to be able to state that the attendance and discipline of the students during the year were satisfactory. The final year's students were afforded abundant opportunities for the performance of all surgical operations on the dead subject in classes which were conducted once or twice weekly throughout the sessions. The daily clinical work supplied ample practical hospital experience for all the classes under the superintendence of the officers in charge of the different wards and under my own supervision.

6. During the year the hospital attached to the college has continued to do good work, but it will be observed that there is a falling off of 800 in the number of patients treated during the year. I do not consider this decrease is due to unpopularity, but to the exceptionally good health maintained by the animals last year in Madras, and also to the increasing number of motor-cars and motor-cycles in use.

7. Below is a tabulated statement with receipts showing the number of patients treated from October 1903 :—

Year.	Total number of patients treated.	Receipts.		
		RS.	A.	P.
1903–1904 (from October) ..	778	2,238	4	6
1904–1905	1,981	6,364	12	1
1905–1906	2,213	7,091	13	1
1906–1907	2,249	6,846	7	10
1907–1908	2,313	8,438	0	0
1908–1909	2,873	11,462	0	0
1909-1910	2,074	14,243	2	10

The new system of collecting payment before discharge of patients partly accounts for the increase in the receipts for 1909–1910, and there is also included Rs. 2,000 from previous years' outstanding debts.

8. The number of operations performed during the year is shown below :—

Animals.	In-patients.	Out-patients.
Horses	232	122
Dogs and others	182	216
Bovines	100	64

9. Hospital Surgeon Mr. A. Douglas's services were placed at the disposal of the Superintendent, Civil Veterinary Department, during the year and Veterinary Assistant Mr. V. Krishnamurthi was appointed in his place and has performed his duties satisfactorily.

10. The museum was further equipped during the year. Valuable models and instruments were received from the Director-General of Stores.

11. The lucerne is still cultivated in the compound of the college and is invaluable for sick patients.

12. The Hon'ble Mr. A. E. Castlestuart Stuart kindly consented to preside at the annual prize distribution and presented the diplomas and prizes to the successful graduates and students.

13. The college sports were held on the 19th of March 1910 ; all the events were keenly competed for. Seven silver cups and many other prizes were kindly presented by the retail business houses and other friends.

14. During the year, considerable extent of land adjoining the college grounds has been acquired by Government for a recreation ground for the students and for building purposes.

15. A Bacteriological Laboratory has been sanctioned which will supply a much-felt want in affording better facilities for the teaching of the contagious diseases of animals. A new pharmacy has also been sanctioned.

16. The hostel attached to the college accommodates 23 students and was full throughout the year. More rooms are urgently required. The health of the students during the year was good.

17. I have been ably assisted in my work throughout the year by the Assistant Principal and Lecturers.

18. A separate office establishment for the college was sanctioned—*vide* G.O., No. 1618, Revenue, dated 18th June 1909—and Mr A. Parthasarathy Mudaliyar was appointed head clerk and Mr. S. Natesa Mudaliyar second clerk and typist, both of whom have carried on their work satisfactorily.

NOTE.—For tables *vide* those in section I.

D. A. D. AITCHISON, I.C.V.D.,
Principal, Madras Veterinary College.

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., Sur., L.R. and Agri.), No. 362, dated 1st August 1910.

The Hon'ble Mr. A. E. CASTLESTUART STUART, C.S.I.

The reports of the Director of Agriculture and the Superintendent, Civil Veterinary Department, on the operations of their respective departments and of the Principal of the Madras Veterinary College on the work of that institution for the year 1909–1910 will be submitted to Government.

2. *Staff.*—Two appointments of Assistant Directors were created during the year, to one of which M.R.Ry. D. Ananda Rao Garu, B. Sc., (Edin.) was appointed. His head-quarters have been fixed at Samalkota in the Northern Division. Mr. R. D. Anstead was recruited as a member of the Indian Agricultural service for 5 years and his services were placed at the disposal of the United Planters' Association of Southern India as Scientific Officer to help the planting industries, with head-quarters at Bangalore. Mr. Shepperson's services having been determined at the end of his three years' agreement, Mr. Wood succeeded him as Principal of the College of Agriculture at Coimbatore and Mr. G. R. Hilson, who had been newly recruited, succeeded the latter as Deputy Director of Agriculture, Northern Division. The superior expert staff of the Agricultural Department received another addition in the person of Mr. McRae who was selected for the appointment of Mycologist. The addition of an Entomologist to the cadre of the Madras Agricultural Department, is still required to bring the equipment to the standard originally contemplated.

3. *Agricultural Stations.*—No new agricultural stations were opened during the year, so that the number of stations looked after by the department remained the same as in the preceding year. The Director of Agriculture proposed the abolition of the Bellary Farm, as the existing site was, in his opinion, unsuited for purposes of experimental cultivation. The consideration of this question has however been deferred by Government to the end of the year 1911. The pumping experiments hitherto conducted at the Hagari agricultural station for the experimental irrigation of black cotton soil have been given up under the orders of Government, and the station is hereafter to be run as a dry farm. The season at all the Agricultural stations was, on the whole, favourable except at Nandyal and Bezwada. Nevertheless, useful experimental and demonstration work was done at these as well as at other agricultural stations.

Sugarcane.—The Mauritius canes introduced into Gódávari have practically displaced the old canes. In South Arcot, where this cane was introduced only three years ago, there has been a rapid expansion of the area under cultivation, nearly 700 acres having been under that cane, out of a total area of 1,000 acres. It would appear that a quarter of the area planted is irrigated dry land, watered from wells. The superiority of this variety is demonstrated by the fact that its yield in juice is about twice that of the indigenous cane and it has the additional advantage of having a harder rind which makes the cane proof against the ravages of jackals, a source of great loss in the past. The cane has also been distributed to cultivators in South Canara and Malabar where it promises to thrive. The Board notes that the Barbadoes cane introduced by the Government Botanist and referred to in the report for

the year 1908-1909 aroused the keenest interest. It was also introduced into Malabar, South Arcot, Vizagapatam and Coimbatore and is stated to be a valuable acquisition to this country. The Board regrets to notice that there has been a recrudescence, though on a small scale, of "Red rot" at Samalkota farm but trusts that the efforts to eradicate the disease may prove successful.

Ground-nut.—The progress in the cultivation of this crop has been maintained on the West Coast, but experiments have shown that manuring will be necessary if the crop is to succeed there. In the north of the South Canara district a large variety of this crop, imported from the Bombay Presidency, seemed to suit the local conditions better than the Mauritius nut. Several other varieties have been tried in other parts of the Presidency with satisfactory results. The greatest obstacle to the rapid extension of the groundnut crop is the tendency in districts where the crop is new to grow it on the same land year after year. The question as to what cereals should be grown in rotation with groundnut is being studied at Palur.

Cotton.—The work on this crop at Koilpatti was continued during the year on the lines described in the previous year's reports. It has been proved that in this tract, Karunganni is superior to Uppam and that its re-establishment has been of great pecuniary advantage to both the grower and the spinner. The experiments conducted at Nandyal with the different varieties obtaining in the Ceded districts showed that there was little to choose between the "white northerns" and "gadag", though the former was slightly better. The Board is glad to note that the seeds obtained from the trials made of the former variety have yielded cotton which, according to expert opinion, is decidedly better than that of the ordinary ryots' crops.

Cambodia cotton.—This is an acclimatised variety of American cotton which has come into prominence of late years in Tinnevelly. It is gratifying to note that yields hitherto thought impossible in India have been obtained from it and that thousands of acres in the district are under this crop. Two points of advantage are mentioned in connection with this crop. The first is that the lint is superior to that of any of the indigenous cottons and will enable the Indian mills to produce yarns and cloth of better quality than is possible at present. The second is that it can be grown on land unsuited for the cultivation of indigenous cottons and gives a far higher yield. The Board trusts that the confident hopes entertained regarding the future of this crop will be realised.

The system of granting premia introduced by Government for growing practically pure crops of cotton in the Ceded districts was abandoned as it was found ineffectual.

Paddy.—The interesting experiments in the direction of single seedling transplantation of paddy carried out at Palur, Samalkota, Taliparamba, Nandyal and in the villages around Hagari have been highly successful. The report describes in considerable detail the work done under this head in pursuance of the orders conveyed in G.O., Mis. No. 918, Revenue, dated 24th March 1910. Closely connected with this question is the observation made by Mr. Sampson, that the free circulation of water is impeded in a thickly-planted crop and that the success of economic planting depends on the free movement of irrigation water with the consequent æration of the soil. As remarked by the Director, this question is one of great importance and should be investigated as soon as possible.

Green manuring.—Efforts were also made in the year to popularise green manure and active steps are being taken to introduce *Sesbania aculeata*, a plant much used in Bengal for green manuring. This plant, it is reported, enjoys an advantage over sunnhemp in that it will grow on land which is slightly saline. It is moreover thorny and, being unpalatable to cattle, is not liable to destruction by them and seems to be free from attacks by insect pests.

4. *Tobacco.*—Government sanctioned the lease to Mr. T. H. Barry of Cocanada of 14 lankas in the Gódávari district at an annual rental of Rs. 8,557 for ten years in order to secure to him the continuous possession of land necessary for experiments in tobacco cultivation. These consist of an attempt to grow wrappers for Indian cigars from Sumatra tobacco grown on the lankas. If Mr. Barry succeeds in his attempts in this direction as he seems likely to do, a new and very profitable industry may be expected to spring up in this Presidency.

5. *Agricultural instruction at the College of Agriculture, Coimbatore.*—Though the full number of students, *viz.*, 20, was admitted each term, the Board regrets to notice that the total number of students at the College of Agriculture at the end of the year was only 32. This result is attributed to the failure of some of the selected students to join the College and to the defection of some of those who had joined, but had left without completing their course. The Board is in correspondence with the Director of Agriculture in order to devise measures to safeguard the College against the vagaries of students. With the help of two outside examiners from Burma and the United Provinces, the second year students numbering 18 were examined for the diploma in the subjects of Botany and Chemistry. An examination was held in Entomolgy also at the same time. In the result, 12 candidates came out successful. These results are being reported to Government separately. On the whole, the working of the College was satisfactory.

6. *Agricultural Associations and Exhibitions.*—Agricultural exhibitions and cattle shows were held at Ongole, Madura, Kizhur, Kalyandrug, Ellore, Pittapur, Berhampur and Kottavalsa. Most of the District Agricultural Associations are reported by the Director to have been inactive, but the Board is glad to note that the Associations of Malabar, South Canara and Kumbakónam proved exceptions. The general inactivity is regrettable but it would probably have been less marked had the Central Agricultural Committee been itself less lethargic. The Board awaits with interest the proposal of the Director to reconstitute these Associations on a more practical basis.

7. *Meteorology.*—The rainfall registered at the various rain-gauge stations was tabulated as usual and the results published by the Meteorologist, Madras, and Deputy Director of the Madras Observatory. The total number of stations in the Presidency at the end of the official year 1909–1910 was 477 inclusive of 84 in the Native States or one more than at the end of the previous year and, of these, 378 stations were inspected.

8. *Statistics.*—The following returns were published in connection with local enquiries under provincial direction:—(1) Monthly season reports in three sections, rainfall cultivation and prices of food-grains and salt; (2) annual crop forecast report in respect of cotton, paddy, groundnut, indigo, sugarcane, castors and gingelly and (3) quarterly reports of cattle mortality.

9. *Civil Veterinary Department—The Madras Veterinary College.*—Twelve students graduated in the year, the percentage of successful candidates having been 57 as against 82 in the previous year. The fall in the percentage of passes in the final year class as well as in classes A and B was not unexpected and was due to the inferior quality of the students admitted into the College owing to the paucity of better applicants. Energetic measures were adopted in the course of the year to secure a better class of candidates with the result that the selections made for class A in January 1910 were quite satisfactory. The Board trusts that no efforts will be spared by the Principal and his staff to show better results in future. The construction of a bacteriological laboratory which should afford better facilities for instruction in contagious diseases of animals as well as of a pharmacy has been sanctioned.

10. *Veterinary hospitals.*—There were seventeen hospitals at work at the commencement of the year and five more were opened during the year, making a total of 22. Of these, seven hospitals, namely, those at Madras, Saidapet, Ellore, Rajahmundry, Ongole, Sivaganga and Tinnevelly Bridge, were maintained by Government. Nine were maintained by Local Boards, of which the hospital at Tiruvannámalai was transferred to Government management towards the close of the year; one was maintained by the Raja of Vizianagaram, two by Native States and two by zamindars, while the hospital at Bellary continued to be maintained by the Society for the Prevention of Cruelty to Animals. The attendance at the Madura and Saidapet hospitals showed no improvement and the figures for the hospitals at Vizianagaram and Bellary also show a slight decrease. The fall in attendance was comparatively large in the Madras Veterinary College and the Ellore hospitals. In the case of the hospital at Madras, the decrease is attributed to the general good health of animals and to the increase in the number of motor vehicles. At all the other hospitals there was an increase in the number of animals treated.

11. *Veterinary Assistants.*—Seven out of the 12 Veterinary graduates who passed out of the Veterinary College in 1909 and one graduate of the Bombay Veterinary College were appointed Veterinary Assistants during the year. The total number of Veterinary Assistants appointed during the year should therefore be 8 and not 7 as reported by the Superintendent. There were four resignations during the period. The work turned out by the practising veterinary staff did not come up to that in the preceding year, only 47,785 head of cattle having been inoculated in the year against 51,087 in 1908–1909. The fall is ascribed to the shortage in the supply of serum from the laboratory at Muktesar and to the fact that, under instructions from the Inspector-General, Civil Veterinary Department, inoculation against certain diseases was either discontinued or suspended. On the Superintendent's own showing, preventive measures of inoculation have resulted in a satisfactory decrease in the mortality of cattle in this Presidency.

The prospects of Veterinary Assistants were much improved during the year, Government having sanctioned the grant of a local allowance as well as of free quarters or house-rent to Assistants in charge of hospitals. Permission has also been accorded to all Veterinary Assistants in the mufassal to undertake private practice.

12. *Pony-breeding operations.*—Government stallions were stationed in the districts of Coimbatore, Salem, Madura and Trichinopoly, and their work showed an improvement on that of the preceding year. There was a large falling off in the number of entires castrated and this result is attributed to the absence of two salustries on leave during portions of the year. Twenty animals were castrated by Veterinary Assistants.

13. *Cattle shows.*—Nine cattle shows were held during the year against seven in the preceding year. The show held at Kalyandrug has not been mentioned by the Superintendent. The shows were on the whole successfully run. They were invaluable from an educational point of view and, in some cases, from a commercial point of view also.

14. *Breeding bulls.*—Eighteen bulls were at work at the commencement of the year. One of these was disposed of by auction as it became unfit for stud purposes. Five out of the remaining 17 bulls were attached to veterinary hospitals and the rest were let loose to graze with herds of cows. Accurate statistics of coverings of the bulls thus let loose could not be obtained, but, as far as could be ascertained, the average number of coverings made by each of them is reported to range from two to ten *per mensem.* Accurate figures regarding the work of the bulls attached to Veterinary Hospitals should have been forthcoming and ought to have been reported.

(True Extract.)

L. D. SWAMIKANNU,
Secretary.

To the Secretary to Government, Revenue Department.
" Director of Agriculture.
" Superintendent, Civil Veterinary Department.
" Principal, Madras Veterinary College.

Order—No. 3298, Revenue, dated 11th October 1910.

Miscellaneous.

Recorded.

2. The report embodies the results of the fourth year's working of the Agricultural Department since its reorganisation. These results are highly satisfactory showing much useful progress in all directions and reflect credit on all the officers of the department.

3. The Coimbatore College was completed during the year under report and was formally opened by His Excellency the Governor on 14th July 1909. No new agricultural stations were opened during the year. The season at all the agricultural stations was, on the whole, favourable except at Nandyal and Bezwada. The Government are glad to observe that the results of the important work on which the department is engaged in the improvement of sugarcane, ground-nut and cotton cultivation continued to be satisfactory, and that successful experiments in the direction of single-seedling transplantation of paddy were carried out at Palur, Samalkota, Taliparamba, Nandyal and in the villages around Hagari. As directed in G.O., Mis. No. 918, Revenue, dated 24th March 1910, the Director of Agriculture has taken steps to extend the knowledge of this improved method of planting. It is reported that many cultivators in Tanjore, who have adopted it, have been able to reduce the rate of seed required per acre from 40–50 Madras measures to 3 Madras measures. In view of the very large area under paddy in this Presidency the saving in seed which can be effected by the use of the single-planting method becomes a matter of considerable importance and the Government note with satisfaction that the Director of Agriculture is giving it the attention it demands. The efforts which were made during the year to popularize green manure met with a fair measure of success. The interest of the cultivating ryots in the work carried on at the agricultural stations continued to grow and was shown by an increase in the numbers of visitors to the stations and by the large quantities of seed which were purchased by them. In G.O., No. 1780, Revenue, dated 31st May 1910, the Government have ordered that the Agricultural Calendar which has hitherto been published in English, Tamil and Telugu only should be published in the other vernaculars of the Presidency, and that copies of the calendars should be supplied free of charge to all village officers in the Presidency. It is hoped that this measure will tend to increase still further the interest in the work of the Agricultural Department which the introduction of the calendar has undoubtedly stimulated.

4. The Government regret to note that the Agricultural Associations with the exception of those of Malabar, South Canara and Kumbakónam are reported by the Director to have been inactive during the year. The Associations have done very useful work in the past and the Government trust that the Director will find it possible to formulate a scheme which will enable them to do so in future.

5. The Government are pleased to observe that the working of the Agricultural College, Coimbatore, was on the whole satisfactory and that 12 out of the 18 students examined for the diploma in the subjects of Botany and Chemistry were successful.

6. Twelve students of the Madras Veterinary College graduated during the year, but the percentage of successful candidates was 57 only as against 82 in the previous year. The fall in the percentage of successful candidates is attributed to the inferior quality of the students admitted into the college owing to the paucity of better applicants. The Government trust that the measures which were adopted during the year to secure a better class of candidates will enable more satisfactory results to be obtained in future.

7. During the year under report five new Veterinary dispensaries were opened and the staff of the Veterinary department was strengthened by the appointment of eight Veterinary Assistants. The fall in the number of cattle inoculated from 51,087 in 1908–1909 to 47,785 in the year under review is regrettable, but His Excellency the Governor in Council is pleased to observe that preventive measures of inoculation have been followed by a very marked decrease in the cattle mortality in this Presidency. The subject is one of the utmost importance to the country and, as already ordered in paragraph 7 of G.O., No. 2709, dated 2nd October 1909, must continue to engage the unremitting attention of the Superintendent, Civil Veterinary Department.

8. Nine cattle shows were held during the year against seven in the preceding year. His Excellency the Governor in Council is glad to observe that the Board is of opinion that the shows were on the whole successfully run and that they were invaluable from an educational, and in some cases from a commercial point of view also.

9. The Government agree with the Board of Revenue that accurate figures regarding the work of the breeding bulls attached to Veterinary hospitals should have been reported.

(True Extract.)

A. G. CARDEW,
Secretary to Government.

To the Board of Revenue (Revenue Settlement).
,, Director of Industries.
,, Public Department.
,, Educational Department.
,, Local and Municipal Department.
,, Public Works Department (Irrigation).
,, Inspector-General of Agriculture.
,, Inspector-General of Civil Veterinary Department.
,, Minister of Agriculture, Argentine Republic.
,, Entomologist to the Government of India.
,, Mycologist do.

Copy to the Government of India, Revenue and Agricultural Department (with C.L.).
Editors' Table.

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on 01 February, 2020